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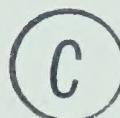
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COMMUNICATIONS IN A GROWING ORGANIZATION

A Study of the Growth
and Internal Communications of the Alberta
Human Resources Research Council from
January 1969 to January 1970

by



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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled "Communications in a Growing Organization," submitted by John Graham T. Kelsey in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

This study examined the growth and internal communication patterns of the Alberta Human Resources Research Council (H.R.R.C.) between mid-January 1969 and mid-January 1970. The growth of the organization was examined in the framework of the three dimensions of size, shape and age. Communications were examined in the framework of an empirically determined tripartite categorization of communication.

There was a great increase in the staff size of H.R.R.C. during the period of the study. In a climate of continuing reassessment the staff were able to agree on a comprehensive revision of the formal structure which was in existence at the beginning of 1969. By the beginning of 1970 the new structure was operational. At this time, too, a social structure among the members emerged in which there were two distinct centres.

The analysis of communications revealed an increasing complexity of networks as the staff size increased. Within the complexity certain dominant features could be discerned. The support staff appeared to be of central importance in all work-orientated communication. Their importance was much less in the networks formed by communication about the organization itself and by in-depth social communication. Analysis of the patterns formed by these two kinds of communication showed the emergence of two distinct groups

of staff. The groups were largely differentiated by their members' positions in the organization or by their concerns with elements of the organization's structure.

The study showed that the internal communications of H.R.R.C. reflected its growth by reflecting the shifting patterns of interaction among the staff and by revealing the effects of staff positions and work upon these interactions. In this sense the study of communications was the study of an important dimension of the organization, and one which complemented the study of its formal structure.

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CHAPTER 1

THE BACKGROUND TO THE STUDY:

PURPOSE AND PERSPECTIVES

The passing of the Act to establish the Human Resources Research Council in 1967 and the working existence of H.R.R.C. from 1968 presented a unique opportunity for students of organizations to observe the birth and growth of a government sponsored research organization. The Department of Educational Administration at the University of Alberta, obtained permission to engage in a series of studies which, together, would present a life history of the organization over a number of years.¹

The first of these studies, by Cleveland (1969), described the genesis and early growth of H.R.R.C. up to January 1969. Among Cleveland's recommendations for further study leading to a more complete documentation of organizational growth was included the suggestion that the internal communication patterns of H.R.R.C. might be studied.

The Purpose of the Study

The present study continued the examination of H.R.R.C. and, following Cleveland's suggestion, took as its focal point

¹The project for the long term study of H.R.R.C. was developed by F. C. Thiemann, at that time a member of the staff of the Department of Educational Administration in the University of Alberta and now on the staff of the Center for the Advanced Study of Educational Administration at Eugene, Oregon.

the internal communication patterns of the growing organization. The purpose of the study was threefold:

- (i) To examine the growth of H.R.R.C. from mid-January 1969 to mid-January 1970.
- (ii) To investigate the internal communications during that time.
- (iii) To attempt to identify relationships, if any, between the growth of H.R.R.C. and the internal communication patterns of the organization.

A Perspective of Growth

The concept of growth can be assumed to be based initially on the observation of biological phenomena. Given this assumption, the application of the concept to anything other than a living organism is a metaphor, but it is a metaphor which is of such antiquity that it is accepted as an empirically verifiable process rather than a conceptual imagery. Perhaps for this reason, the term growth has acquired a great number of meanings. As Medawar (1957:108) writes:

'Growth' is a word of notorious imprecision, but it strongly defies semantical reform.. It may mean increase of length, area, weight or volume; it may mean the act or accomplished fact of reproduction, i.e. increase of number; or it may simply mean development--the adverb is not well chosen--with all that development implies of increasing complexity and elaboration.

Medawar is writing as a biologist. He goes on to make the point that some aspects of what we commonly call growth--accretion, for example--have no part in biological growth, and he offers an illustration:

The idea that the growth of organisms can be likened to, for example, the growth of houses, is not acceptable, even in the roughest first approximation. The two processes have nothing in common at all (1957:110).

This distinction notwithstanding, however, the biological model of growth offers tempting analogies for the study of organizational growth. Scott (1968) in his discussion of the growth of organizations leans heavily on the three biological dimensions of size, shape and age which he takes from Medawar (1945). Haire (1959) attempts to analyse empirical data on the growth of four organizations in terms of a biological model, and two of the categories postulated by Starbuck (1965) of models for organizational growth carry biological names--cell division and metamorphosis.

With the exception of Haire, however, these writers concede that the biological model is not completely accurate. Scott, while finding Medawar's three dimensions of great value, claims that the model as a whole has given us no more than proverbs of organizational growth (1968:143-148), and Starbuck suggests the difficulty of precisely spelling out the way in which the analogy is valid (1965:483). Haire's biological theory of organizational growth has been subjected to stringent evaluation by Draper and Strother (1963) who concluded that ". . . the biological model does not seem to be valid for describing or predicting the growth of organizations, nor does it appear to be a source of hypotheses for further research" (p. 194).

The data on which Haire's study was based were size and time data in terms of the numbers of different personnel

employed in different functions at various times in the lives of each of the four organizations studied. This use of time series data instead of cross section data avoids, as Haire points out (1959:292), a "spurious growth curve" which ignores "the dynamics within an organization." It is from the dynamics of an organization that "the pressures which threaten to crack the organization" arise, and Haire expands this idea:

As the organization grows, the force that seems likeliest to destroy it is the centrifugal force arising from the fact that the members are individuals and tend to fly off on tangents toward their own goals (1959:302).

At this point in his analysis, Haire is no longer concerned with rates of growth or with the biological theory of the rate of growth. He is concerned with events which affect the structure or shape of an organization. His statement refers to all three of the growth dimensions used by Medawar and noted above--size, shape and age. Whatever position is taken in respect to the use of biological analogies of growth, these three dimensions are useful ones within which to consider organizational growth.

Size is conveniently measured by numbers of employees or size of plant; age by months or years of existence. The shape of an organization may be defined in terms of its members' functions and behaviours. The three dimensions are inextricably linked. "As organizations increase in size," writes Grusky (1961), "the complexity of organization increases . . ." Starbuck (1965:453) states:

Growth is not spontaneous. It is the consequence of

decisions . . . These decisions are, in turn, functions of the goals pursued by members of the organization.

The increased complexity resulting from the increase over time in the number of members and from their decisions has been noted to lead to various kinds of change. Starbuck's "adaptive process" (1965:480-482) includes formalization, the formation of an organizational social structure, the hardening and also the dissolution of coalitions, the shifting of operational goals, the inventing and discarding of procedures and rules and the opening and closing of communication channels. Litterer (1965) points to additional features, the development of the co-ordination function and the emergence of specialised, as opposed to universal, managers.

Organizational growth, then, may be seen not merely as increase in size, not merely as increase in age, but as a process in which an increase in size over time is accompanied by shifting dynamic relationships between members of the organization. As Simon (1953:236) expressed it:

The process is a learning process in which growing insights and successive restructurings of the problem as it appears to the humans dealing with it reflect themselves in the structural elements of the organization itself.

A Perspective of Communication

Whatever definition is made of human organization, it is clear that it must include the notion of people working in concert. This notion implies the existence of communication. Writers on organization are agreed on the importance of communication in organization. Barnard

(1938:91) claims that communication "would occupy a central place" in any theory of organization, Bavelas and Barret (1951: 368) describe it as ". . . the essence of organized activity and . . . the basic process out of which all other functions derive," and Dubin (1961:307) refers to communication as ". . . one of the foundation stones upon which organization rests."

Communication, however, is not a simple matter. The straightforward definition--the transmission of meaning from one individual to another (Friesen, 1968)--belies the complexity of the phenomenon of communication. It is bound up with a host of variables--with the structure of the group (Leavitt, 1951), the functions of its members (Leavitt, 1951), the nature of their task (Heise and Miller, 1951; Shaw, 1954), their status, rank and geographical location (Smith, 1966), the personalities of the communicators, their different perceptions of "reality" and their attitudes, beliefs and feelings (Mellinger, 1956; Borden, Gregg and Grove, 1969).

Gibb (1961:141) has referred to communication as ". . . a people process." It seems logical to suppose that, since the attitudes, beliefs, feelings and perceptions of the communicators make communication the complex phenomenon it is, an increase in the number of communicators will increase the difficulties of conducting communications research.

Bavelas and Barrett (1951:371) note that ". . . the job of mapping an existing net of communications, even in a relatively small company, is a complicated and difficult one," and they go on to speak of ". . . bridging the gap between

the simple, directly controlled experiment and the very complex, indirectly controlled social situation." Studies in a non-experimental setting have shown ways in which particular communications move through a social structure (Festinger, et al. 1948), which people commonly communicate readily with each other (Jackson, 1959, Smith 1966) and, to some extent, why they do so (Jackson, 1959a). These studies do not appear to show how or why communication patterns develop.

The insights afforded by the experimental studies and the comparatively few field studies, have been used in two main ways. One perspective sees communication as an administrator's technique to influence behaviour and has led to the production of a considerable body of writing on the "improvement" of communications. Articles carry such titles as: "Recognizing Roadblocks in Communication Channels" (Culbertson, 1959), "Towards More Effective Communication in Supervision" (MacKinnon, 1963), "Major Communication Problems in the Schools" (Erickson and Pedersen, 1966), "Towards Strategies of Effective Communication" (Friesen, 1968).

Another perspective regards the study of communications not as a study leading to improved techniques by the administrator, but as a contribution to a knowledge of communicative behaviour in organizations and to the body of general sociological knowledge. Jackson's (1959a) résumé analyses organizational communication and contains no expeditious overtones.

A third perspective of communications in an

organization exists (Cook, 1951), but does not appear to be widely used. It is referred to by Jackson (1959a: 495) and is to some extent incorporated in the study by Smith (1966). This perspective is concerned with processes of communication as pointers to the state of the organization in which they operate. The assumption is made that, since communication patterns form, in part, in response to organizational variables, a study of these patterns may reveal the organizational forces which work on them and through them. Communications are taken to be symptomatic of other aspects of organization. They are not seen as processes to be "improved" as a necessary precondition to the more efficient working of the organization. The sociological emphasis becomes not, "How do communications work?" or "What communication patterns exist?" but "How do the communication patterns in existence reflect the functioning of the organization?"

Cook (1951:14) writes:

What is usually meant by effective communication is not the means for achieving harmonious human relations, rather it is the natural consequence of such relations.

Jackson (1959:167) expresses the same idea: ". . . what we call communication problems are often only symptoms of other difficulties which exist among persons and groups in an organization." If communications can be symptomatic of problems, then they may also arguably be symptomatic of other aspects of organizations--of leadership style, of change, of growth.

The present study used this third perspective of

communications. By trying to determine communication patterns at different points in time over twelve months in the life of H.R.R.C., it sought to describe the growth of the organization during that time.

Communications in a Growing Organization

Juxtaposition of the two perspectives described above of (1) communications and (2) growth, raises the question of how the communication patterns in an organization may reflect its growth. This question may be considered against the three dimensions of growth: size, shape and age.

Size. The logical possible number of relationships within and between a group of people of size N has been expressed by Graicunas (Gulick and Urwick, 1937) as:

$$N \left(\frac{2^N}{2} + N - 1 \right)$$

Following this formula, it is clear that the number of possible relationships increases enormously as the number of people increases. If one objects that many of the logically different relationships (e.g., A with B in C's presence as distinct from A with C in B's presence) are unreal distinctions, it is nevertheless true that an increase in group size brings with it a great increase in the number of possible communications relationships within the group. Even if one considers only direct communication between two group members, the number of possible links in a group of size N is $N(N - 1)$. Thus, whereas three people have six possible links (A with B, A with C, B with A, B with C, C with

A and C with B), twelve people would have 132 possible direct links.

There appears to be a limit on the number of close relationships which any one person can have with others (Jennings, 1950) and this leads Newcomb, Turner and Converse (1965:363) to conclude that ". . . in groups larger than a dozen or so, continued interaction of a personal nature occurs for the most part in relatively small sub-groups." Hare (1952) in a laboratory situation found that groups larger than twelve formed sub-groups more readily than did smaller groups.

It seems logical, then, to conclude that an increase in the staff size of an organization will be accompanied by the emergence of a number of sub-groups. One way in which such groups can be identified is by an analysis of communication patterns to reveal the extent of interaction between different people.

Shape. If the increased size of an organization is accompanied by the emergence of communication sub-groups, its shape may well be discerned by asking what sub-groups emerge.

The formalization process (Starbuck, 1965:477-482) is one way in which an organization shape evolves. One would expect the subdivision of personnel by various task areas to be reflected by the formation of task oriented communication groups.

The co-ordination function noted by Litterer (1965: 403) which is a necessary accompaniment of sub-division, implies communication between task areas or between specified

personnel in the task areas. The emergence of specialised managers also noted by Litterer (p.405) may be translated in a research organization as the emergence of unit or project heads and the degree of co-ordination may be reflected by the extent of communication between them. Their emerging status and others' perception of that status may result in differential communication patterns between statuses (Smith, 1966).

To view the informal relationships in an organization as a separate "structure" is misleading. Iannacone (1964:225) points to a ". . . weakness in the use of the terms formal and informal organization as dichotomous concepts . . . ,"
and Blau (1955:3) stresses that the interactions within the organization ". . . form consistent patterns that are new elements of the organization." The formation of an organizational social structure referred to by Starbuck (1965:482) implies the formation of communication patterns which may overlap the formalized patterns of interaction to a greater or lesser extent. It may also imply many different patterns of communication in coexistence, and such a situation is explicitly described by Guetzkow.

As communication within an organization becomes stabilized, the flows become somewhat differentiated with specialized networks based upon the message contents, whether they are concerned with authority, information, task expertise, friendship or status. (1965:568)

Age. To ask how these communication flows "become stabilized" is to consider the age dimension of organizational growth. The question arises: when do different kinds

of communication sub-groups emerge?

Starbuck (1965:473) distinguishes three kinds of change in an organization: in ultimate goals, in task structure and in social structure. He further states that each corresponds to a reason for organizational membership: members may be attracted by the organization's goals, by their activities in the task structure or by the social structure. In a developed organization it is conceivable that all these motives for membership can be present among the members, but in a new organization it seems unlikely. Starbuck writes:

Members of a new organization . . . tend to be attracted by either goals or task structure. They tend not to be attracted by the social structure . . . As an organization ages, its members' central commitments undergo a shift in emphasis towards the organization's social structure (1965:474).

In a new organization, where recruitment is spread over a period of months, as in H.R.R.C., one may expect new members to join the organization first for reasons of organizational goals, then in order to participate in some particular task, and only much later to be attracted by an established social structure. This expectation is reinforced when one considers that only after the initial core staff had worked out policies and programs for H.R.R.C. (Cleveland, 1969), were other research staff appointed to carry out the programs.

It may be expected that the periods at which different kinds of communication networks form will reflect the kinds of change which take place in the organization at different times as well as the member's reasons for joining.

Summary

The growth of an organization may be seen as a complex interplay of three dimensions: size, shape and age. As the number of staff increases over time, so do the formalization and socialization within the organization. The patterns of communication between the members of the organization may be seen as a reflection of its growth.

The purpose of this study was to determine the communication patterns of one young organization (The Alberta Human Resources Research Council) as they changed over twelve months and to attempt to relate these changing patterns to the growth of the organization.

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CHAPTER 2

THE DESIGN OF THE STUDY I: THE PROBLEM, ITS DELINEATION AND THE COLLECTION OF DATA

THE PROBLEM

The purpose of the study as stated in Chapter 1 may be alternatively expressed as being an attempt to obtain an answer to the question: How is the growth of H.R.R.C. from mid-January 1969 to mid-January 1970 reflected in the internal communication pattern of the organization?

In order to examine this question, it was restated in the form of sub-problems relating to each of the dimensions of the study outlined in Chapter 1.

Sub-problem 1

What were the features of the growth of H.R.R.C. in terms of size, shape and age?

Sub-problem 1.1: Size. (a) How many in-house staff were employed by H.R.R.C. from mid-January 1969 to mid-January 1970?

(b) What physical plant was used by H.R.R.C. from mid-January 1969 to mid-January 1970?

Sub-problem 1.2: Shape. (a) What was the formal

organizational structure of H.R.R.C. from mid-January 1969 to mid-January 1970?

(b) What changes took place in the tasks performed by the members of H.R.R.C. from mid-January 1969 to mid-January 1970?

(c) What was the social structure in H.R.R.C. from mid-January 1969 to mid-January 1970?

Sub-problem 1.3: Age. When did changes, if any, occur in the areas of sub-problems 1.1 and 1.2?

Sub-problem 2

What were the communication patterns within H.R.R.C. between mid-January 1969 and mid-January 1970?

Sub-problem 3

What relationships existed between the communication patterns in H.R.R.C. from mid-January 1969 to mid-January 1970 and the growth of the organization?

THE DESIGN OF THE STUDY

The study was designed as a case study of the organization. Blau writes of case studies that they

. . . have the major advantage of lending themselves to interlocking various research procedures. Direct observation, documents and interviews can be used to obtain a variety of systematic empirical data on any particular problem (1955:4).

A further feature of the case study is that it is a

study of a carefully defined unit which, nevertheless, seeks to maintain the wholeness of the object studied (Goode and Hatt, 1952:321-340). The present study identified growth and communication patterns as the units for study in the framework of the organization of H.R.R.C. The definitions used in the study, and a discussion of the variables, delimitations and limitations, together with the justification for the study, conclude the second section of this chapter.

Definitions

Many terms specific to H.R.R.C., such as Research Officer, Support Staff, program area and the like, will either be defined as they occur, or will be clear from the context in which they are used. The definitions given here are the operational definitions of the concepts used in the study.

Growth. By growth is meant change in the size, shape or age of the organization.

Communication. Communication refers to the verbal exchange of meaning between individuals.

Communication patterns. Communication patterns are the structure of communication links between individuals or groups.

Communication network. The term "communication network" refers to all communication links identified in the organization at any one time.

Clique. A clique is a group of three people each of whom has a direct communication link with the other two. The members of a clique may also have communication links with individuals outside the clique.

Clique set. Several cliques with overlapping members may be referred to as a clique set.

The Variables

Growth. The elements of growth which were considered in this study have been outlined above in the statement of sub-problems. In considering changes in the size and age of the organization the changes themselves (number of staff, use of plant, months of operation) could be readily investigated. A consideration of changes in the shape of H.R.R.C., however necessitated also the examination of any processes within the organization which led to change.

Communication. It is manifestly difficult, in an organization such as H.R.R.C., concerned with social research and staffed by intelligent and articulate members, to distinguish clearly between a "work" conversation and a "social" conversation. For example, an exchange of views about the nature of society or politics or sociology may be a conversation between interested persons in a social setting, but it may, equally, be a conversation which relates directly to the work of these persons.

A resolution of this difficulty necessitated an

examination of what kinds of conversation took place in what situations at H.R.R.C. Non-participant observation of staff interaction enabled five kinds of communication to be distinguished which fell into two broad categories. The classification is shown at Figure 1.

The two main categories are of "social" and "work" conversations. Social conversation which is an exchange of greetings or light, casual conversation is easily recognised and these two categories are self explanatory. By in-depth social conversation was meant a discussion of problems or interests in a way which analyses, seeks causes or propounds solutions and which takes place in a social setting rather than in a work setting. In the category of project/role-specific work conversations were considered those exchanges which related directly to a particular member's research project or to his function in H.R.R.C.--this included, for example, a conversation between the Business Manager and a Research Assistant either about the Assistant's project or about a matter of supplies for which the Business Manager was responsible. The final category of work conversation--concerning the organization, its structure, policies and problems--is, again, self-explanatory and arises from the kind of interaction which Simon (1953:236) called a "learning process" about the organization itself and its mandate.

Since the first two categories of social communication were reported so universally as to make the analysis of their networks meaningless, the study considered only the

SOCIAL	WORK
Greetings exchanged	Project/Role specific (work communication)
Light, casual	
In-depth	Concerning the organization: structure, policies, problems. (organization communication)

Figure 1

Categories of Communication
for Purposes of Analysis

remaining three types, referred to for convenience as "in-depth social", "work" and "organization" communication respectively.

The Delimitations of the Study

This study was restricted to a consideration of the growth of H.R.R.C. between mid-January 1969 and mid-January 1970 and of the internal communications of its members over that time.

In the analysis of communication patterns, this study considered only communications between in-house members of H.R.R.C., i.e.; those staff with offices in the building occupied by H.R.R.C. It did not take into account conversations involving staff, staff associates or consultants whose offices were not in the building, nor did it consider communication which took place away from the premises occupied by H.R.R.C., except where it occurred in the context of a formally convened meeting or retreat.

The Limitations of the Study

The study was subject to the following major limitations:

1. The extent to which information was made available to the researcher.
2. The extent to which the information given to the researcher was an accurate representation of the informants' perceptions.
3. The fact that data were collected either at the

end of the period being studied or subsequently. The findings, accordingly, are in many cases subject to the qualification that they are dependent on the accuracy of respondents' recollections.

4. The interpretations made by the researcher of these recollections.

These last two points are referred to again in a discussion of the reliability and validity of this research.

The Justification for the Study

The justification for the present study lies in three areas. First, as one of a set of studies of H.R.R.C., it examines the growth and internal communications of the organization over a period of time immediately following the period examined by Cleveland's (1969) study. The present study is thus of importance in adding to Cleveland's study and in increasing knowledge about the nature and development of H.R.R.C. as well as in providing part of the material from which a future life history of the organization might be written.

Second, the study can be justified as a case study which adds to the knowledge already available about features of organizations in a period of growth, and particularly about the internal communications of an organization in such a period. Moreover, in its attempt to examine communication patterns over a period of time, by means of time-series data, the study differs from most studies of organizational communication which take a cross-sectional view of different

organizations at one period in time.

Finally, the study sought to relate in some measure the behavioural and structural dimensions of an organization. Organizational studies in the main have tended to analyze one or the other of these dimensions. A partial description of the relationship between them may be of interest to students of organizations.

DATA COLLECTION

The data for the study were collected through observation, through interviews with H.R.R.C. staff and through the perusal of documents. Document perusal was designed to yield data about growth. Observation was intended to provide data about communication and general familiarity with the organization. The interviews aimed to elicit information about both dimensions of the study. Each method of data collection is described in this section with reference to when and how it was used and what data it yielded. The section concludes with some discussion of the reliability and validity of the data.

Observation

Non-participant observation of the activities of H.R.R.C. was carried out during the month of January 1970. It enabled the researcher to become familiar with the identities of the various staff members of the organization more quickly than would have been possible had data collection been restricted to individual interviews.

Observations were made on sixteen separate occasions during the month of January 1970 during periods varying in length from one to five hours. Different locations were used and included the main reception area, the staff lounge and library, the hallways and the conference room.²

The data derived from these observations provided some evidence of staff mobility within the building, gave several clues to the interests and preoccupations of staff members and were the major source of information about the extent and nature of the communication which took place in the coffee room. A further advantage of the observation technique was that it enabled the identification of reference points and examples of behaviour which were valuable in the subsequent interviewing of respondents. Finally, it was as a result of these observations that the classification of communication categories noted above³ was developed.

Interviews

Personal interviews with the in-house staff of H.R.R.C. were the major source of data. They furnished information about both dimensions of the study.

Twenty eight members of the in-house staff of H.R.R.C. were interviewed between January and May 1970. In addition, one research assistant resident in Europe at the

²A plan of the building occupied by H.R.R.C. is shown on page 48.

³supra. pp. 22-23.

time when interviews were held submitted written responses to an interview schedule which was mailed to her. Staff not interviewed were four secretaries (three of whom left during or shortly after January 1970) and four "part-time" research assistants.⁴ Of these four, two had joined H.R.R.C. in November 1969.

Total in-house staff at mid-January 1970 numbered 37, so that 78.4% of in-house staff were interviewed. Since it became apparent that communication between the secretarial staff and the research staff was almost entirely work-oriented or light, casual social conversation, and since the part-time research assistants who were not interviewed spent much of their time working away from the building, the number of respondents interviewed was judged to represent the in-house staff population of H.R.R.C. and no attempt was made to use sampling procedures.

All interviews followed the same pattern and fell into two parts which were administered together in single sessions ranging in length from one to two and a half hours. The interview schedule is reproduced at Appendix A.

Part I was designed to obtain information about communication, and took the form of the repeated question, "Who is . . . ?" The question was asked about each member of the in-house staff and respondents were asked to describe their communications with him or her. A description was

⁴The term "part-time" is used by H.R.R.C. to denote staff who, although they may spend all their working time with H.R.R.C., do not have a 12-month contract.

asked for which gave the extent and type of communication and which indicated any changes in the pattern of the respondent's communication with each staff member. Questions about changes in communication were aimed at building up a picture of the communications networks at five periods--April, June, August and Fall, 1969 and January 1970.

Part II of the interview sought to obtain data about the career background of each respondent, his reasons for joining H.R.R.C., the method of his appointment and the way in which his job was specified at the time of appointment. Further questions asked about each respondent's socialization into the organization and his patterns of work, the problems he met and his sources of help; final questions probed his perception of the importance of the geographic lay-out of the building, of the communications at H.R.R.C. and of which staff were most influential. Since respondents were encouraged to regard questions in part II as "open-ended" questions, there arose in individual interviews supplementary questions which are not included in the Appendix, but which were put to gain amplification of an answer or to bring the respondent back from a digression.

Perusal of Documents

Documentary evidence was used in the collection of data relating to the growth of H.R.R.C. The sources included office records, memoranda, minutes, mimeographed papers and publications of H.R.R.C. When used, sources are listed in the bibliography.

Reliability and Validity

Interviews--the most important source of data in the present study--have long been accepted as a reliable method of obtaining an individual's views and perceptions (Menzel and Katz, 1955, Festinger et al., 1948:477). The reliability of the normal interview, however, although it seems applicable to the second part of the interview used here, may well not apply to the first part whose questions were essentially sociometric.

It is difficult to assess the reliability of socio-metric tests because of the likelihood that an individual's choices may change and that group relations may not remain constant. In spite of this, Sellitz et al. claim that studies of the reliability of sociometric data indicate that:

. . . although there may be considerable variation in specific choices, patterns of group interaction and various scores or indices derived from the data are quite stable (1965:269).

The communications dimension of the present study was closely concerned with patterns of group interaction and thus the difficulty of establishing the reliability of the socio-metric data was not held to be a serious problem. Moreover, if stable patterns of interaction are revealed by sociometric data, then changes in the pattern revealed by respondent's recollections may reliably be considered to have occurred

The validity of the data was increased in three ways. Data about the growth of H.R.R.C. were validated either by matching documentary evidence with individuals' reports or by seeking confirmation of a point from several respondents.

Communications data were validated by considering only reciprocated responses. Thus if person A claimed communication with person B, the claim was not included in the data unless person B also claimed communication with person A.

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CHAPTER 3

THE DESIGN OF THE STUDY II:

THE ANALYSIS OF DATA

Two basic methods of analysis were used in the study, each related to one of the two dimensions of growth and communication.

The Growth Dimension

The analysis used in examining the growth dimension may best be termed historical in that it considered the data by topics and chronologically. Documents and interview transcripts were examined for evidence bearing in turn upon each of the sub-problems (1.1, 1.2, 1.3) identified in chapter 2.

The Communications Dimension

The method of analysis used for the communications dimension of the study was sociometric. Sociometric data are usually presented in the form of either a sociogram or a sociomatrix,⁵ the latter being the newer technique. Some account of the development of the use of the sociomatrix will better explain the analysis used in the present study.

The construction of the sociomatrix. The use of

⁵The term "sociomatrix" is a commonly accepted contraction of the longer "sociometric matrix" and appears to have been originated by Forsyth and Katz (1946).

sociometric data was pioneered by Moreno (1934), who portrayed them in the form of a sociogram in which lines representing choice or rejection were drawn between points representing people. The result was a diagram which may be likened to a "map" of certain relationships between the members of a group.

The interpretation of such a map for a large group, however, is a somewhat onerous task and Forsyth and Katz (1946) showed that the same data could conveniently be presented in the form of a matrix--the sociomatrix. A simplified example of a sociomatrix built from hypothetical data is given in Figure 2. The matrix is constructed so that the names of the subjects are recorded from left to right along the top edge of the matrix in the same order as they are recorded from top to bottom down the left hand side. The choice of member C by member A is shown as an entry at the intersection of row A and column C. The nature of the entry will depend on the purpose of the analysis and the kind of data collected and may be choice or no choice (1 or 0), choice or rejection (1 or -1), or a scale of preferences (1, 2, 3, etc.).

The identification of sub-groups. Although Forsyth and Katz (1946) claimed that the sociomatrix enabled a much easier identification of sub-groups than was possible in the sociogram, doubts have been raised about their claim by more recent students. Miklos and Breitkreutz (1968:242) refer to sub-group identification as a problem which ". . . has persisted as one of the most intriguing problems in sociometric

	A	B	C	D	E	F	G	H	I
A	0	1	0	1	1	0	0	0	0
B	1	0	0	1	0	0	1	0	1
C	1	0	0	1	0	0	0	1	0
D	1	1	0	0	0	1	0	1	1
E	0	0	0	0	0	1	1	0	0
F	1	0	0	0	1	0	1	0	1
G	0	1	1	0	1	1	0	0	0
H	0	0	1	1	0	0	0	0	1
I	0	1	0	1	1	1	0	1	0

FIGURE 2

AN EXAMPLE OF
 A SOCIO MATRIX BUILT FROM
 HYPOTHETICAL DATA ^(a)

(a) Represents answers to the question "Do you communicate with . . . ?" An entry of 1 indicates an affirmative answer, 0 a negative one.

analysis." They outline the four main stages in the development of methods for the solution of the problem: the inspection of sociograms, the manipulation of the rows and columns of the sociomatrix, matrix multiplication and factor analysis.

Matrix manipulation (Forsyth and Katz, 1946; Beum and Brundage, 1950) consists in rearranging the rows and columns of the matrix so that persons who choose each other are grouped together. When this is done clusters of positive entries may be observed in the cells of the matrix.

The first direct applications of matrix algebra to the sociomatrix were made by Festinger (1949) and Luce and Perry (1949). Chabot (1950) has written a very clear explanation of the techniques and the logic behind them in his description of their use in an empirical study.

Essentially, the method shows the number of different kinds of links between members of the group. A binary matrix is constructed, i.e., the cell entries are 1 or 0, where 1 signifies choice and 0 signifies no choice. The squaring of this matrix will reveal the number of two-step links between individuals. Thus, if person A chooses (likes, communicates with, prefers) person B, who in turn chooses person C, there is one two-step link between persons A and C. This will be shown by a figure 1 at the intersection of row A and column C of the squared matrix. If a figure 2 appears at the intersection of row D and column F, it means that person D chooses two people who, in turn, choose person F. Numbers in the diagonal cells indicate the numbers of mutual

choices in which each individual is involved.

The cubed matrix extends this principle and shows the number of three-step links between individuals. The entries in the diagonal cells of a cubed matrix show the number of three-step links from an individual back to himself (A - B - C - A). If a clique is defined as three individuals who mutually choose each other, and if only reciprocated choices are shown in the matrix, then the existence of cliques is revealed by the entries in the diagonal of the cubed matrix.

Although this restricting definition of a clique was relaxed by Luce (1950) who defined an N-clique as a sub-group of individuals who are all N or fewer links removed from each other, the question of the definition of a clique or sub-group is fundamental to these analyses and an alternative way of defining the sub-group has led to the use of factor analytic techniques.

Factor analysis is a method of ascribing an element to one group of elements or another by considering its relationship to all elements. To use factor analysis, then, for the purpose of sub-group identification, is to define a sub-group not in terms of its members' relationship to each other, but in terms of their relationship to all other members of the total group.

Factor analytic methods for the identification of sub-groups have been used by Wright and Evitts (1951), McRae (1960) and Blocker, McCabe and Prendergast (1964). Three Alberta studies (House, 1966; Breitkreutz, 1967; Martin, 1968) have been based on the work reported by Blocker, McCabe and Prendergast.

The identification of sub-groups in the present study.

Although each of the techniques described above adds an increasing sophistication to the analysis, it is by no means clear that it is a sophistication which gives increasingly penetrating insights into the problem of sub-group detection.

In the present study the definition of a sub-group implied by the use of factor analysis was rejected. It was felt more reasonable to define a communication sub-group in terms of its members' closeness to each other rather than in terms of their relationships with all other members of the organization. Support for this position is given by Glanzer and Glaser who write:

It may be . . . that the Luce-Perry type of analysis [matrix multiplication] is best suited for certain types of relationships (communicates with, influences) whereas a vector analytic approach is best suited for other relationships (chooses, find himself similar to) (1959:328).

In selecting alternatives to factor analysis an unsuccessful attempt was made to combine matrix manipulation with matrix multiplication by means of a computer program. Specimen data were cast in a sociomatrix which was rearranged by the computer so that groups of people who communicated with each other were placed adjacent to each other. This rearranged matrix was then squared, cubed and again rearranged. Two problems arose which made the method less useful than had been hoped. First, in a large matrix the rearrangement of rows and columns did not result in any very clear-cut clustering of entries. Second, the ordering of people in the rearranged first-power matrix differed from that in the

rearranged cubed matrix, thereby making inconclusive any attempt at sub-group definition.

The analysis which was finally used consisted of three parts: the drawing of sociograms (for visual comparison), the use of the cubed matrix (for the detection of three-person cliques) and an analysis of the membership of overlapping cliques (for the identification of possible sub-groups). The method of data handling was as follows:

1. The communications data were cast in the form of matrices and unreciprocated entries were ignored so that the data might be better validated (Jennings, 1960; Moreno, 1954).
2. From each matrix a sociogram was drawn.
3. By means of a computer program⁶ the matrix was cubed and the cubed matrix printed.
4. The computer was used to print details of all three-person cliques existing in the matrix. The resulting print-out was in the form of lists for each person of the cliques to which he belonged.
5. The lists were analyzed to determine the extent to which cliques overlapped to form clique sets.

This procedure was followed for each of the three main types of communication at each of five periods: April 1969, June 1969, August 1969, Fall 1969 and January 1970.

⁶All computer programs used in this study were devised by R. Liknaitzky.

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CHAPTER 4

THE GROWTH OF H.R.R.C.

The examination of the growth of H.R.R.C. was undertaken in terms of the three dimensions of size, shape and age, and the presentation here of the findings of the examination follows the order of the sub-problems set out in chapter 2. Since it is unrealistic to refer to any aspect of growth without also referring to a time scale, some mention of the time dimension is present throughout the chapter. The section treating specifically the age dimension of analysis will attempt to draw together the findings relevant to that dimension.

SIZE

Sub-problem 1.1(a). Staff

Sub-problem 1.1(a) asks: How many in-house staff were employed by H.R.R.C. from mid-January 1969 to mid-January, 1970?

Staff lists provided by H.R.R.C. showed that there were nine in-house staff in mid-January, 1969. Twelve months later, H.R.R.C. records listed thirty-seven in-house staff. During this period, no staff members (with the exception of seven "summer assistants") left the organization. The addition of twenty-nine staff members represents, therefore, an overall increase in the in-house staff size of

422 percent.

Of itself, this overall figure does little more than indicate a high rate of growth. Of greater interest is the detailed breakdown of the increase. Figure 3 shows in-house staff additions over time from the inception of H.R.R.C. until mid-January 1970 and distinguishes between the different levels of appointment of Research Officer (senior research staff), Research Assistant, Support Staff (Information Officer, Editor, Business Manager) and Secretarial Staff. Each bar on the diagram at Figure 3 represents one staff member. The position of the bar relative to the time scale on the horizontal axis indicates the date at which that person joined the organization. During the period of the study the numbers of personnel at all levels increased. The greatest increase was at the level of Research Assistant. Sixteen Research Assistants took up their appointments between mid-January 1969 and mid-January 1970. The proportion of new appointments at the secretarial and support staff levels was less, five new secretaries, one Business Manager and one Editor being appointed. The lowest proportionate increase was among Research Officers, of whom five were appointed.

A convenient way of examining these differential increases over time is to express them as ratios. Table 1 presents the ratios of each level to the others at three points in time, the beginning, the middle and the end of the period of the study. Although the ratio of

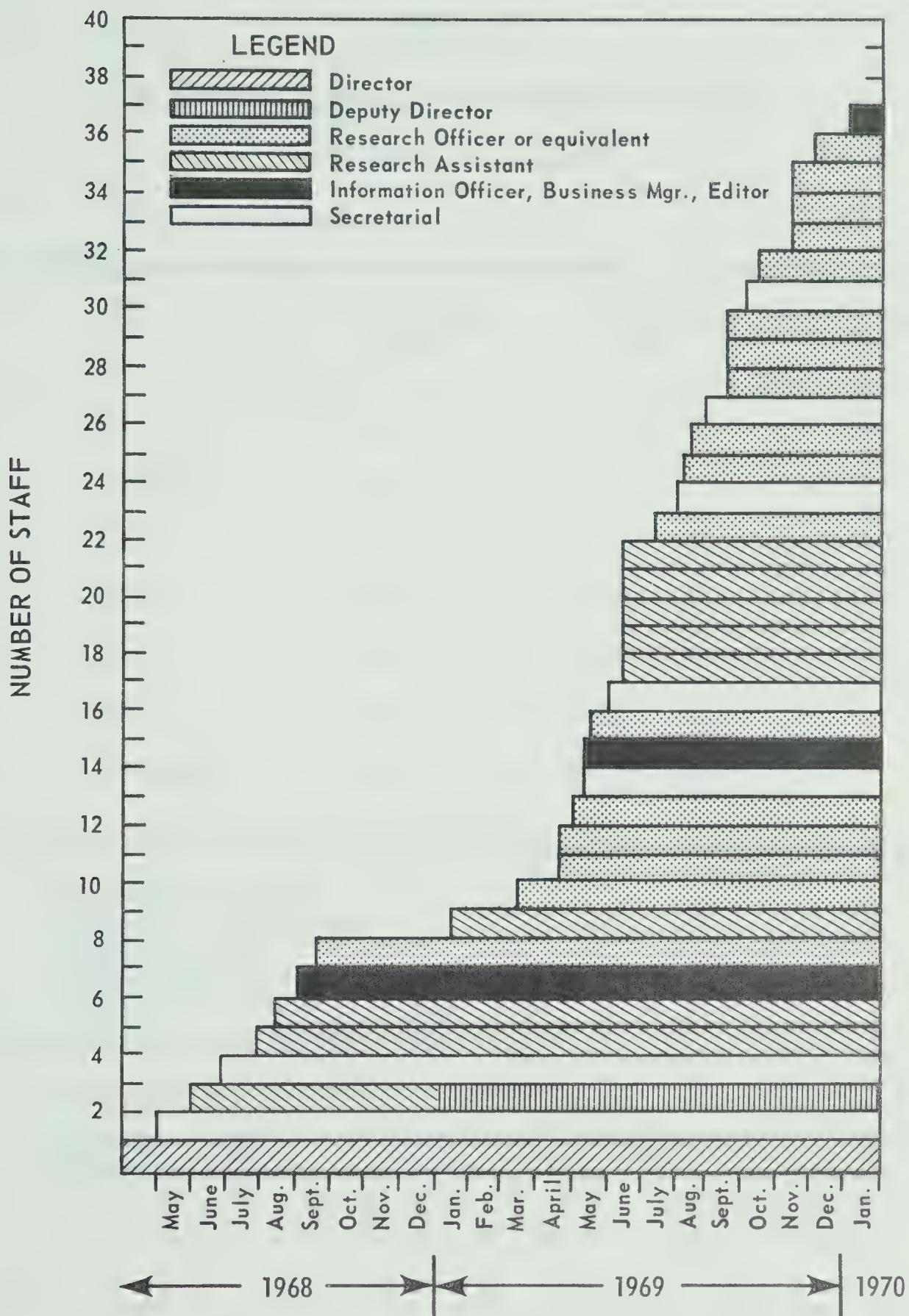


Figure 3

H.R.R.C.: Staff Additions from
Inception to Jan. 1970^a

^aSource: H.R.R.C. Records

TABLE 1

H.R.R.C. TOTAL STAFF RATIOS AT THREE
POINTS IN TIME^(a)

		Mid-January 1969	Mid-July 1969	Mid-January 1970
RO ^(b)	: RA	5.0 : 1	1.7 : 1	0.6 : 1
RO	: SUPP	5.0 : 1	5.0 : 1	3.3 : 1
RO	: SEC	2.5 : 1	2.5 : 1	1.25 : 1
RA	: SUPP	1.0 : 1	3.0 : 1	5.7 : 1
RA	: SEC	.0.5 : 1	1.5 : 1	2.1 : 1
SUPP	: SEC	0.5 : 1	0.5 : 1	0.4 : 1
RES	: NONRES	2.0 : 1	2.7 : 1	2.5 : 1

RO Research Officer
 RA Research Assistant
 SUPP Support Staff
 SEC Secretarial Staff
 RES Research Staff (RO + RA)
 NONRES Non-research Staff (PNRS + SEC)

(a) Derived from H.R.R.C. records.

(b) Director and Deputy Director included here as having Research Officer function.

total research staff to total non-research staff increased slightly over the twelve months, the most marked ratio changes are those representing Research Officers and Research Assistants. The establishment of a broader-based pyramid in terms of levels of personnel is clearly seen in the downward trend of the ratios of Research Officers to all other staff and the corresponding upward trend in the ratios of Research Assistants to other staff.

Sub-problem 1.1(b). Physical Plant

Sub-problem 1.1(b) asks: What physical plant was used by H.R.R.C. from mid-January, 1969 to mid-January, 1970?

From September, 1968, H.R.R.C. occupied premises at 11507 - 74th Avenue, Edmonton. These premises had formerly been used at different times as a cerebral palsy clinic and a cancer clinic, and the lay-out of the building was, therefore, not specifically designed for H.R.R.C.⁷

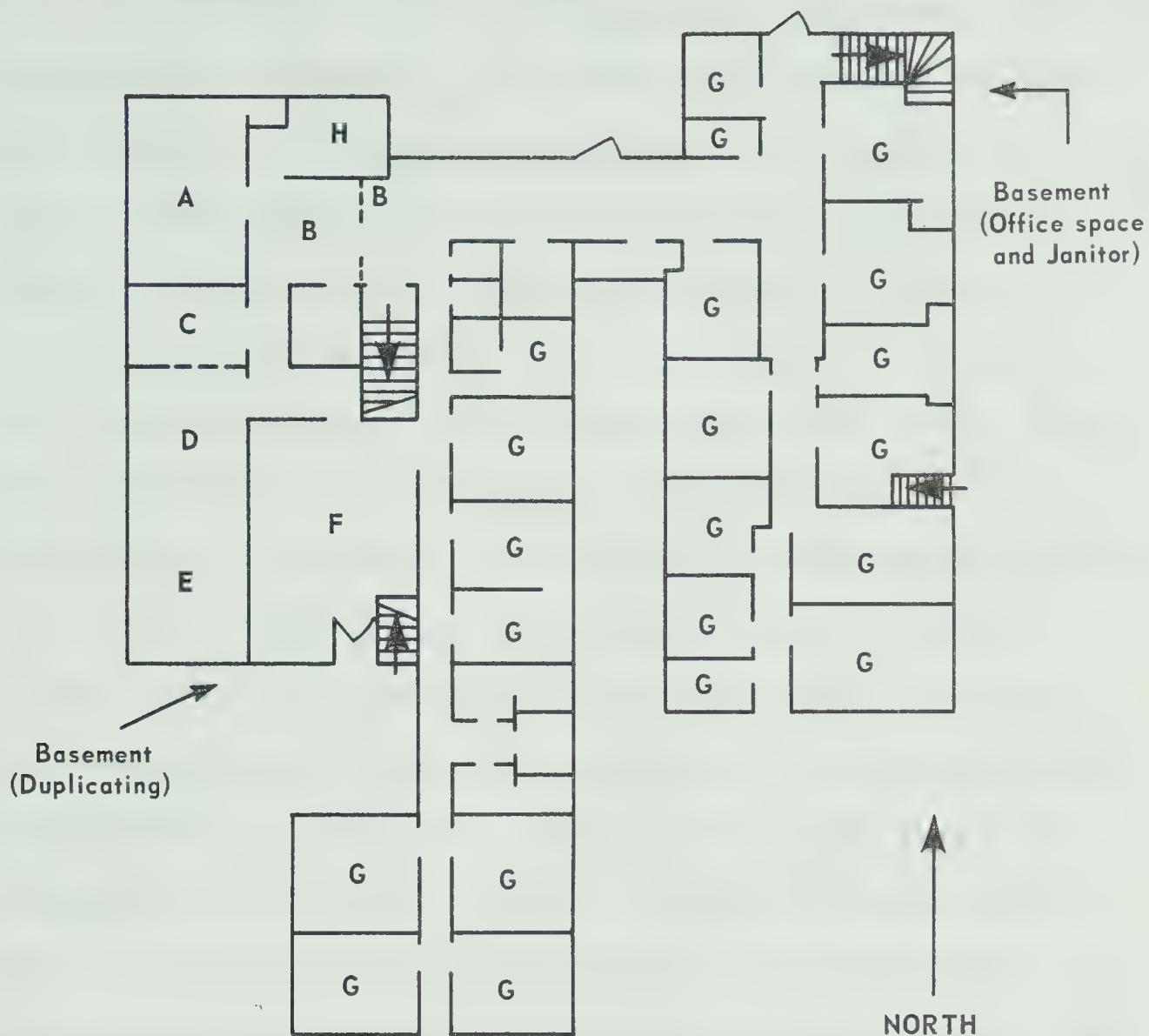
By the end of 1969 the need for extensive renovation or removal to new premises was being discussed by Council. The Department of Public Works of the Government of Alberta had recommended, in late 1969, that some structural alterations should be carried out to make the building usable for two to three years. Their recommendations did not include major alterations or extensions to the

⁷Data concerning the use of the building were obtained from H.R.R.C. records, from personal observation and from interviews with the Business Manager, the Deputy Director, two Research Officers and the Director's secretary. Any other sources are specifically referred to where appropriate.

building, since it was felt that the best long-term solution to the problem of accommodation might well be for H.R.R.C. to be located on the University of Alberta campus. The minutes of the H.R.R.C. Council meeting of December 15th, 1969 report the acceptance, by Council, of these recommendations. The plans for the proposed renovations had already been drawn up and in accepting them, Council agreed that work should begin on them immediately.

No work had been carried out, however, by the end of January, 1970 so that for the period of the study the building remained unchanged. A sketch of the floor plan is shown at Figure 4. Initially the building provided far more space than was needed by the small staff. The Director's office in the northwest corner and the offices in the south end of the west wing were the only offices used at the beginning of 1969. Expansion into other areas was not great before July, 1969. After July, however, the rapid increase in staff size brought the rest of the building into use and several reallocations of office space were made.

These reallocations were made by the Business Manager after consultation with the senior staff and were organized primarily in accordance with the division of the work of H.R.R.C. into distinct program areas. In January, 1970 the offices in the west wing were occupied by personnel working in the broad area of planning studies, with the exception of one office at the north end of the wing which



LEGEND:

- A Director
- B Director's Secretary and Reception
- C Kitchen
- D Coffee Lounge
- E Library
- F Conference Room
- G Office Space
- H Business Manager

Figure 4

was used by the Information Officer. The north-east corner of the building housed the Deputy Director (who was also the Co-ordinator of Organizational Services) and his Associate Co-ordinator. The east wing was used mainly by staff working on Education Studies, but included also the office of one member of the Socio-Economic Opportunity Studies unit and the offices of two members of the Evaluation Services staff. On her arrival in January, 1970, the Editor was also housed in the east wing. The office space in the east basement was used by the Co-ordinator of Forward Planning and two Research Assistants.

The coffee lounge and kitchen were frequently used by the staff, but the nature of the building, with its clear separation of two main areas of office space, seems, nevertheless to have been held to exert some divisive influence in the organization. Nineteen of the twenty-eight staff interviewed either made direct reference to the restrictions imposed by the building or implied their importance by using such phrases as, "He's on the other side," or, "He has an office over there." The impression gained from interviews was that the two wings--"Education" and "Planning"--represented the two main and separate areas of the H.R.R.C. program.

SHAPE

Sub-problem 1.2(a). Formal Structure

Sub-problem 1.2(a) asks: What was the formal

organizational structure of H.R.R.C. from mid-January, 1969 to mid-January, 1970?

Cleveland (1969) has reported the development of a program of research around which H.R.R.C. was to be structured. The period documented by him concluded with the acceptance, by the Council of H.R.R.C., of an organizational structure based on seven program areas. A diagrammatic representation of this structure was published by H.R.R.C. in April, 1969 (inform, 1969:4), together with an explanatory text which described ". . . seven program areas organized round two program themes: Planning and Policy Studies and Research and Development Studies."

At the end of the period of the present study the organizational structure had changed. A new structure was described in a Director's memorandum to staff (Downey, 1969d) as consisting of five major program areas and two support units. The organizational chart representing this structure was reproduced later in the Second Annual Report to the Legislature (H.R.R.C., 1970:3) in a form which was redrawn, but otherwise unchanged, from that in the Director's memorandum to staff.

During the period January, 1969 to January, 1970, then, there were two successive structures in H.R.R.C. This section of the present chapter will describe the basic organizational model from which both grew, will consider the two structures in terms of their similarities and contrasts, and will examine the processes by which the earlier structure

was replaced by the later.

An organizational model. Cleveland (1969:115-119) has described the search by the initial staff of H.R.R.C. for a model for the organization. One of the H.R.R.C. staff position papers written during the early formative period of the organization and cited by Cleveland (1969:119) was that by McIntosh and Hudson (n.d.[1968]). This paper argued for a pluralistic organizational strategy and proposed an organizational model which would be unique in that it would resemble no single existing model, but would incorporate aspects of several. The authors wrote:

. . . we envision a research organization which is structured, in part, on the foundation model (inasmuch as it incorporates mechanisms for funding proposals submitted by independent scholars); in part, as a contracting agency (inasmuch as it looks beyond itself for the talent and expertise it requires); and, in part, an in-house R and D Center (inasmuch as it includes a built-in capability for the conduct of certain kinds of research and development) (pp. 21-22).

The influence of this proposal by McIntosh and Hudson can be inferred from the continuing restatement, over the next year, of the ideas it put forward (H.R.R.C., 1969b:4; Downey, 1969a:12-13; inform, 1969:1; Downey, 1969b:16; Orbit, 1969:26). At the beginning of 1970 the influence can still be discerned in the Second Annual Report to the Legislature which, although not referring specifically to the three functions noted above, stresses the plurality of the H.R.R.C. enterprise and describes the organization as:

. . . a unique agency whose role it is to stimulate, to activate, to support, to fill gaps, to mobilize resources, and to coordinate the efforts of many agencies and

individuals toward the resolution of specific social problems (H.R.R.C., 1970:1).

It was within the context of this ". . . sort of tripartite structure" (Orbit, 1969:26) that the development of the internal organizational structure took place. The two succeeding organizational diagrams of 1969 may be seen as formalizations of the in-house arm of H.R.R.C.'s activities and of their connections with the other two aspects of the organizational model.

Two structures. Although Cleveland (1969:iv) noted that the question of an organizational structure was an unresolved issue, the program of research activities of H.R.R.C. which he reported and which was approved by Council on January 16th, 1969, formed a firm base for the organizational diagram published in April, 1969 (inform, 1969:4). Similarly, at the end of the year, the Council meeting of December 15th approved the program of research which was illustrated by the organizational structure described in the Director's memorandum to staff issued the same day.

These two organizational diagrams--which may be said to mark the differing structures at the beginning and end of 1969--are reproduced at Figure 5 and Figure 6. The two diagrams are clearly different, but a comparison of them cannot rest solely on an examination of the evident differences between them; both have similarities as well as points of contrast.

The structures compared. Probably the most important similarity between the two organizational diagrams is that neither represents the "reality" of the organization at the

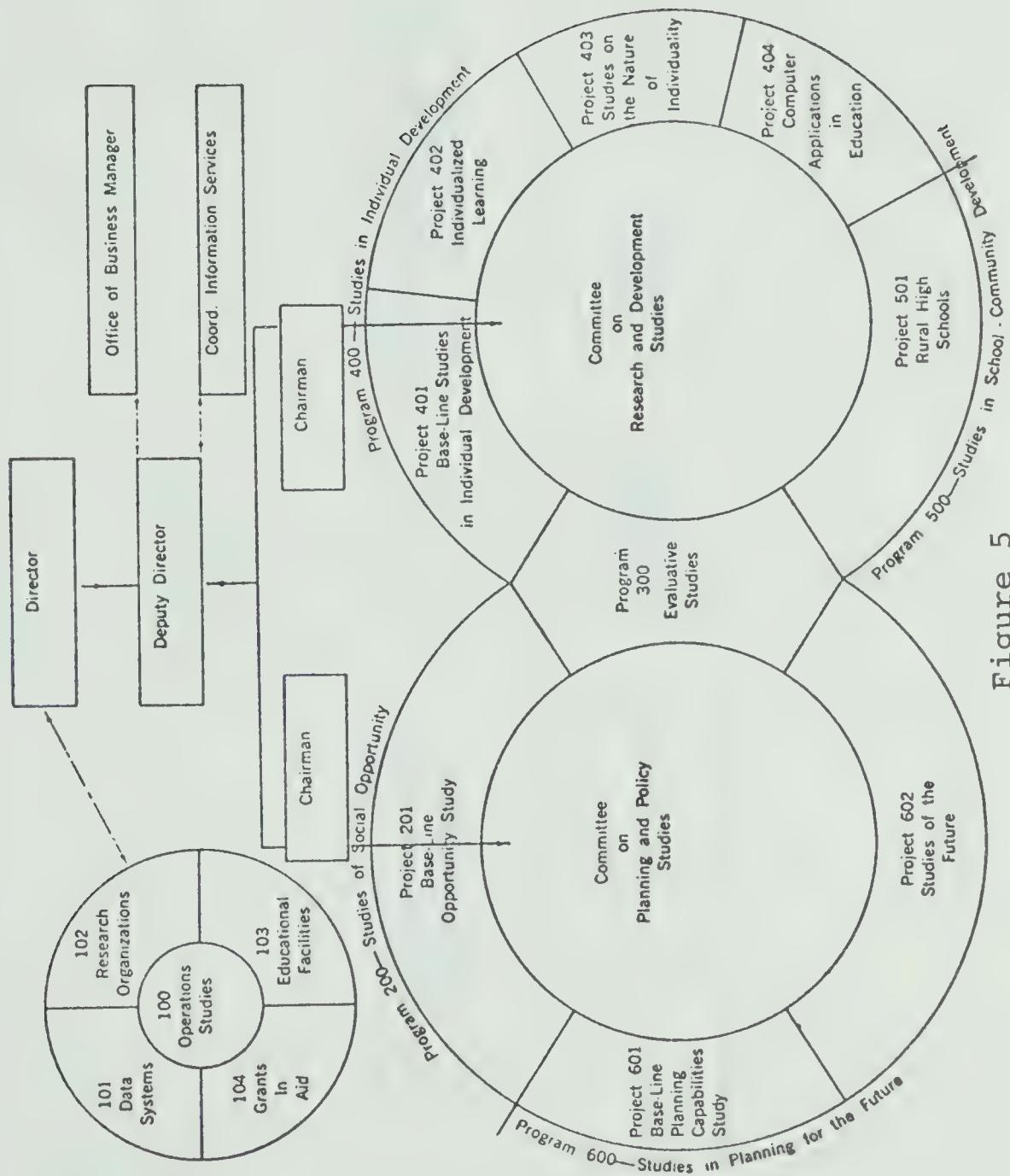


Figure 5
H.R.R.C. Organizational Diagram April 1969

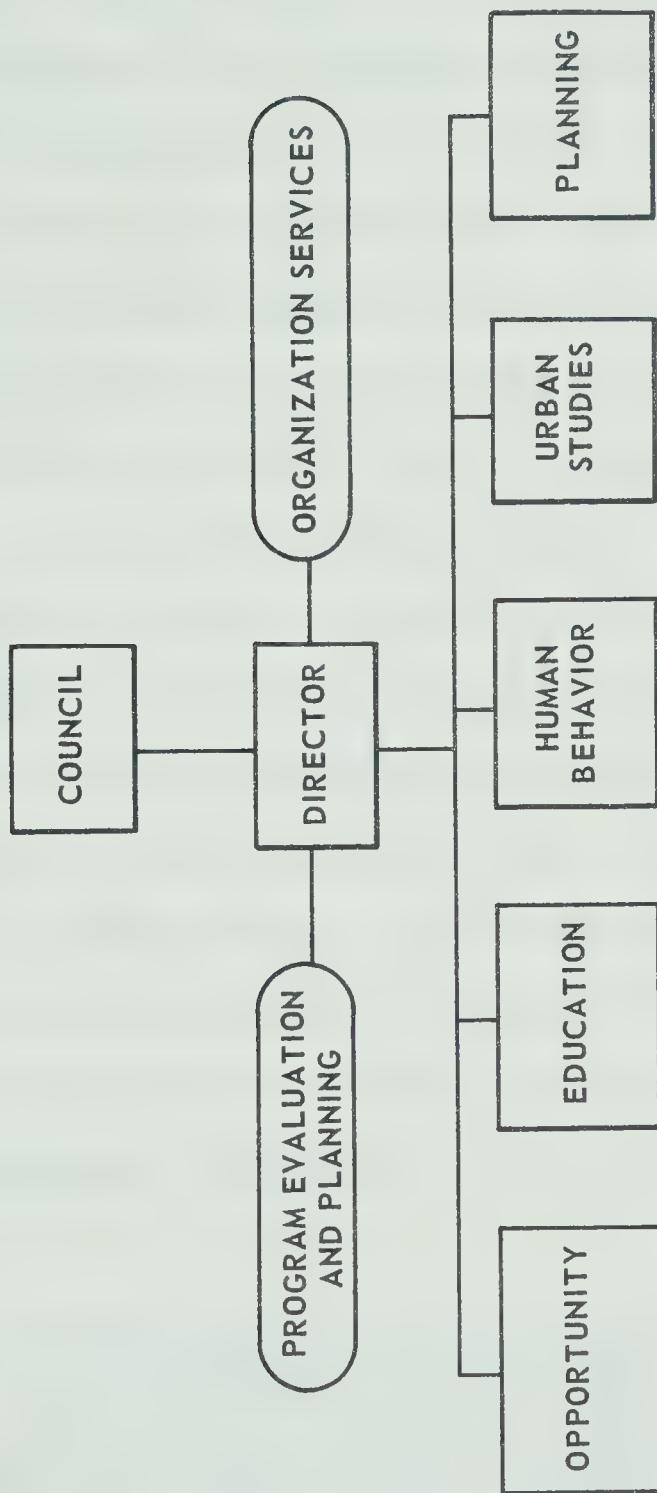


Figure 6

H.R.R.C. Organizational Diagram
December 1969

date of its publication.

An examination of the H.R.R.C. staff list shows that in April, 1969 there were employed, in addition to the Director and Deputy Director and two secretarial staff, three Research Officers, two Research Assistants and an Information Officer. Although there is evidence (Ingram, 1970; Dyck, 1970) that some senior staff were involved in program planning or proposal writing prior to their physically taking up their appointment, it is clear that most project areas were not staffed in April, 1969. Similarly, in January, 1970, two program areas (Human Behavior and Urban Studies) were embryonic and had no full-time in-house staff, and a third (Socio-Economic Opportunity Studies) was represented among the in-house staff by one Research Assistant and was coordinated by an out-of-house Staff Associate.

In a sense, then, the formal organization charts of H.R.R.C. were blueprints for activity at the time of their publication rather than formalizations of existing activities. As one respondent, referring to the later chart, expressed it:

. . . To some extent it represents reality, to some extent it represents what we hope will be future reality . . . If you looked at the chart and saw Urban Studies with a box the same shape as Education Studies, for example, you would be led to believe that these are under way--coequal. But of course, they are not (Dyck, 1970).

This notion of the organizational charts as blueprints for activity leads to the identification of a second similarity between them. Both are representations of a total program of research and its subdivision rather than flow

charts of personnel functions. In indicating those areas with which the organization was concerned, the charts do not fully express the way in which it functioned to operationalize and coordinate its concerns. In one sense, such a comment is superficial, since the very existence of an organizational chart implies operational as well as conceptual subdivision of program areas. In another sense, however, the comment is less superficial--how, for example, did the inter-unit coordination function operate? Such a function may be implied by the vertical and horizontal lines in the diagrams, but the implication is not clear and the lines may merely represent lines of communication to and from the Director. The text accompanying the first chart makes no mention of inter-unit coordination. The accompanying text to the second diagram refers to unit Coordinators who work ". . . within the policies established by the Council and/or by the 'Program Committee' (a committee of program coordinators)." (Downey, 1969d:2), but neither the function nor the detailed composition of this committee is spelled out, nor does the committee appear on the organizational diagram.

A third similarity between the two diagrams emerges from the consideration of an apparent contrast between them. The impression of circularity in the earlier diagram contrasts sharply with the linear impression given by the later one. A close examination, however, reveals this to be a pseudo contrast. Both diagrams are essentially pyramidal in shape and both have "wings," or units above the main base, connected

horizontally with the office of the Director. What the first diagram represents in circular fashion are the projects within each program area, and such project areas or sub-units are excluded from the later diagram. A similar consideration of omissions leads to the observation that the Council is not shown on the earlier chart. If it is assumed that the position of Council vis-a-vis the operation of H.R.R.C. was unchanged, (an assumption supported by a study of the minutes of Council), then the argument for the similar shape of the two diagrams receives further support.

The structures contrasted. Although the shape of the two diagrams may be described as a pseudo contrast, there is a real contrast in the impression given by the shapes. The emphasis on circularity in the earlier diagram may be held to carry an implication of integration within the two main program themes which is absent in the design of the later diagram. The five program "boxes" of the latter give an impression of greater separateness which is reinforced by the reference in the accompanying text to ". . . each of the five program areas as a semi-autonomous unit. . ." (Downey, 1969d:2) (emphasis in the original).

The main contrast between the two structures, however, lies less in the semi-autonomy of the units in the later diagram than in the detailed contents of each diagram. An examination of each diagram and its accompanying text shows the program on which the late 1969 structure was based to have been different both in its scope and in its organization

from the earlier one.

The greater scope of the later structure can be seen in the addition of two new program areas, Human Behavior and Urban Studies. The different organization of the program is illustrated in Figure 7 which shows the way in which the contents of the earlier structure were transformed into the five major program areas and the two support units of December, 1969. The program areas represented by the two large circles in the earlier diagram became three units of the revised structure. Research and Development studies (program areas 400 and 500) were both included in the new Education Studies, whilst Planning and Policy Studies (program areas 200 and 600) became the two new units called Socio-Economic Opportunity Studies and Planning Studies. A reorganization of the early program areas 100, 300 and 700, together with the area designated as "Office of the Business Manager," resulted in the two support units of the later structure, Organization Services and Program Evaluation and Planning Services.

Between the Structures: The Processes of Change

The processes by which the changes in the formal structure of H.R.R.C. came about seem to have been continuous rather than sudden. They took place in a climate of continuing self-appraisal and critical re-evaluation and they were manifest in three main ways, (1) in the individual production of position papers (2) in group processes and (3) in an officially instigated program of criticism and revaluation. Each of these aspects will be elaborated in

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DECEMBER 1969

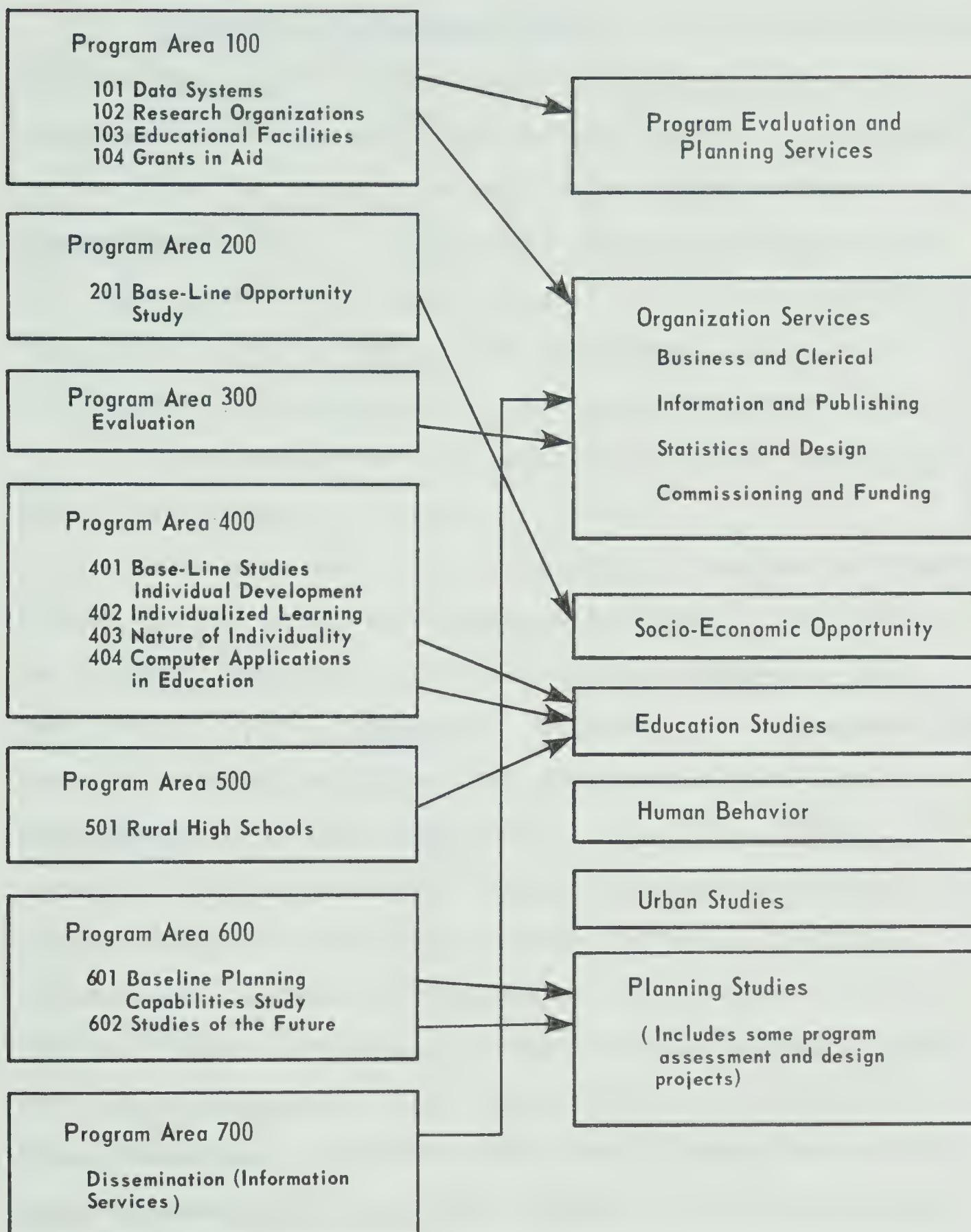


Figure 7

H.R.R.C. Research Program Structures in
January and December 1969

the following paragraphs.

A Climate of self-appraisal. The five-phase planning process used by the initial staff of H.R.R.C. has been documented by Cleveland (1969:96-114) and is also reported by the Director in his foreword to the organization's Prospectus (H.R.R.C., 1968:i-ii). The Director describes the first phase of that process as ". . . an attempt to lay firm hold of the mandate." The Prospectus points to the difficulties of accomplishing this phase and states that ". . . clarification [of the mandate] must be a continuing task of the Council." (H.R.R.C., 1968:7).

The existence of this notion of a continuing clarification and the ongoing re-examination which it implies can be inferred throughout the twelve months following the publication of the Prospectus. Moreover, it encompassed not only the attempt to lay hold of the mandate, but also the development of the programs and policies. The likely necessity for changes in the structure and operation of the organization was repeatedly referred to both in official reports and in public statements by the Director (H.R.R.C., 1969b:4; Downey, 1969a:14; Downey, 1969b:10; Downey, 1969c:11). In his address to the Alberta Ministers' Conference on Urban Education in November, 1969, the Director described his awareness of the need for ongoing re-evaluation of the organization's direction:

It is to be anticipated . . . that the goals and functions of H.R.R.C. will shift with shifting conditions in society; that priorities will change with the changing

nature of the problems associated with social policy development; and that strategies will evolve in accordance with the working relationships that H.R.R.C. is able to develop with other research agencies in the province (Downey, 1969c:11).

In pursuing a policy of constant re-evaluation and refining, the Director was concerned to utilise the talents of his staff. In a personal interview (Downey, 1970), in which the nature of his communications with the rest of the staff was being discussed, he referred to several occasions on which he had been reluctant to channel the thinking of staff. His policy seems to have been that staff should think creatively for themselves about the problems of the organization and their work in it rather than circumscribe their thinking in accordance with his direction.

An article on H.R.R.C. which appeared in Orbit at the end of 1969 emphasises the part played by the Director in setting a climate of continuous self-appraisal:

He [the Director] has insisted on a continuous appraisal right from the outset . . . His watchwords are 'fluidity, reexamination and redirection'. 'One of the things we talk most about here,' he says, 'is anti-institutionalism' (Orbit, 1969:27).

Individual position papers. The first issue of the second volume of the H.R.R.C. information bulletin, inform lists all papers produced in the organization up to January, 1970. Twenty-six working papers, occasional papers and major papers are mentioned in addition to research reports, proposals, projects under way and symposia. Of these twenty-six, most deal with subjects directly related to research projects. Some of these have implications for H.R.R.C.

policy (Klimek, n.d.; Friedenberg, n.d.). Several papers are expositions of the genesis, problems and policies of H.R.R.C. (Downey, 1969a; Downey, 1969b; Downey, 1969c; Ingram, 1969; Willson, 1969). Two papers in particular (Fisk, 1969a; Fisk, 1969b) are specific attempts critically to examine the H.R.R.C. mandate.

These latter are papers which seek to analyse the documents on which the creation of H.R.R.C. was based⁸ and the conceptualizations within those documents. In examining the meaning and implications of the concept of human resources in modern society, they stress the need for critical thinking and raise questions about the nature of a human resources research organization.

Group processes. Two in-depth examinations of the role, structure and strategies of H.R.R.C. took place in a group context during 1969. The first of these was informal and was a series of seminars which became known as "the Fisk seminars." The second was a retreat, convened by the Director, at Red Deer in September.

The Fisk seminars--named after their instigator, the author of the two papers referred to above--took place in the summer of 1969 and were conducted in an atmosphere of leisure in the gardens of H.R.R.C. They appear to have been attended by almost all members of staff. There is no evidence that any problems were settled at the seminars, but there is

⁸The White Paper on Human Resources Development, and the "Act to Establish the Alberta Human Resources Research Council."

considerable evidence that important issues were raised and freely discussed. Most respondents who were on staff at the time of the seminars referred to their value as a means of communication about the problems faced by a human resources research organization.

The Red Deer retreat was attended by the senior staff and some others at the invitation of the Director. It was a deliberate attempt to come to grips with past and present problems of the organization and their implications for future development. By being physically removed from the everyday concerns of their research and by being able to concentrate on the broader issues exclusively for two days, those who attended were able to arrive at a consensus on a new structure for the organization.

Their discussions resulted in the postulation of a program based on four principles (of complementarity, of a mission orientation, of a systems approach, of a thematic approach) and operationalised in four program areas (McIntosh and Fisk, 1969). Slight subsequent modification of these proposals resulted in the new organizational structure accepted by Council and launched by the Director's memorandum to staff on December 15th, 1969.

An officially instigated program of criticism and re-evaluation. The Red Deer retreat was part of a specific program of reassessment instigated by the Director in August, 1969. One senior staff member was assigned the task of conducting this program and he and his assistant

produced their report in October, 1969 (McIntosh and Fisk, 1969). This report includes a description of the genesis of the reassessment program and the way in which it was conducted (pp. 2-3).

Staff interaction had preceded the Director's decision to undertake the program. The report describes how, as the year progressed, the structure of early 1969 ". . . was found inadequate for coordinating and facilitating the activities of staff members." Some problems arose from the great increase in staff size, others from relative understaffing in certain areas. McIntosh and Fisk write: "There was a growing awareness on the part of staff members that the organizational structure . . . was not facilitating our work in the way we had expected" (1969:2).

In carrying out the program of reassessment, the two staff members concerned were able to involve the whole staff of the organization. They undertook:

. . . a period of extensive consultation with staff members in order to gather their ideas for revision of research programs and organization. New ideas were fed back into individual consultations and staff meetings for further reaction from staff (McIntosh and Fisk, 1969:3).

The culmination of the program at the Red Deer retreat was merely the final stage of a long period of examination and re-evaluation in which virtually the whole staff had in some way been involved.

Sub-problem 1:2(b). Task structure

Sub-problem 1:2(b) asks: What changes took place

in the tasks performed by the members of H.R.R.C. between mid-January 1969 and mid-January 1970?

With the changes described above in the formal structure of H.R.R.C. went some changes in the kinds of work done by staff members. The work of the majority of members, however, does not appear to have been subject to radical change. The indications are that most of the staff appointed after the initial planning phase were appointed to task areas in which they remained at least until January 1970.

Nine of the twenty-nine members interviewed indicated that their tasks had changed between January 1969 and January 1970. These nine can be categorised in three groups. Five of them had been appointed in 1968 and thus formed part of the initial core planning group of the organization. Of the remaining four, two were appointed about the middle of the year (May and July) and two in October.

An examination of the changes reported by these nine members shows three kinds of change: a change in the areas of responsibility within the organization, an extension of responsibilities within the organization and a change affecting only the member's work within his own area of responsibility rather than his working relationships with the rest of the organization.

These three kinds of change can be regarded as separate in that each occurred in a different group of staff. In general, the five members who had formed part

of the intital staff acquired changed responsibilities within the organization, the two who were appointed in mid-year saw an extension of their responsibilities, and the tasks of the two October appointees changed within their own unit area.

Changed organizational responsibilities. The tasks of the five early appointees changed partly because certain aspects of their work became the concern of new staff and partly because of redefinition of their roles.

The Research Officer whose early responsibilites had included a large part of the planning of studies in the education area was relieved of much of his concern in this field when the Chairman of Research and Development Studies (later designated Coordinator of Education Studies) took up his appointment in July. Similarly, the Deputy Director, early involved in the initial planning of the social opportunity studies, had a less central interest in that area after the appointment of a senior consultant and a full-time Research Assistant to what became known as Socio-Economic Opportunity Studies. The Director's secretary as well as the Deputy Director and one other Research Officer were relieved of direct concern with much of the more mundane internal administrative work by the appointment of a Business Manager in May.

As the staff increased, the questions of role definition became more important for the early members of the organization (Housego, 1970; Hudson, 1970) and the redefinition of roles was able to take account of the

individual interests of members. As a result some members' work changed. The Research Assistant who had initially worked with two other people in two different areas was able to move to a full-time concern with welfare studies, and the "Grants Officer" was able to concentrate more on his administrative interests and remove himself from the role of an evaluator of incoming research proposals. This latter work became an integral part of the role of the Research Officer in charge of Forward Planning.

Extended responsibilities. Two staff members reported that their responsibilities had extended. The Research Assistant initially appointed to examine the political role of the organization retained this function, but, in addition, became increasingly involved in the program of organizational re-evaluation which has already been discussed. One staff member, appointed as a Post Doctoral Fellow, found his work leading to an increasing involvement with various education projects and became designated Associate Coordinator of Education Studies.

Task changes within an area. The two staff members who reported a change of work within their own area were Research Assistants whose change of work had little effect on their relationships with the rest of the organization. In one case the original area of work was discontinued because of a withdrawal of (non-financial) support outside the organization. In the other case the original task proved less productive than had been hoped

and the recognition of this fact led to a change in the program of work of the Assistant concerned.

Sub-problem 1:2(c). Social Structure

Although at least two points in 1969 the staff of H.R.R.C. appear to have been a relatively close-knit group, it is arguable that the closeness did not represent a social structure as much as it represented a work structure. In Starbuck's (1965) terms, the staff of H.R.R.C. were concerned to establish the goals of the organization and then the task structure.

The definition of goals and task structure was the framework within which the small staff of early 1969 operated. The Deputy Director spoke in an interview of ". . . a happy band of planners," and went on, ". . . until March or April we worked very much as organizational planners, as a large group--we did everything together" (Housego, 1970). The other point at which the staff were to some extent united by common concerns was during the summer of 1969 when the "Fisk seminars" took place.⁹ These, again, were in the context of an examination of organizational goals and policies.

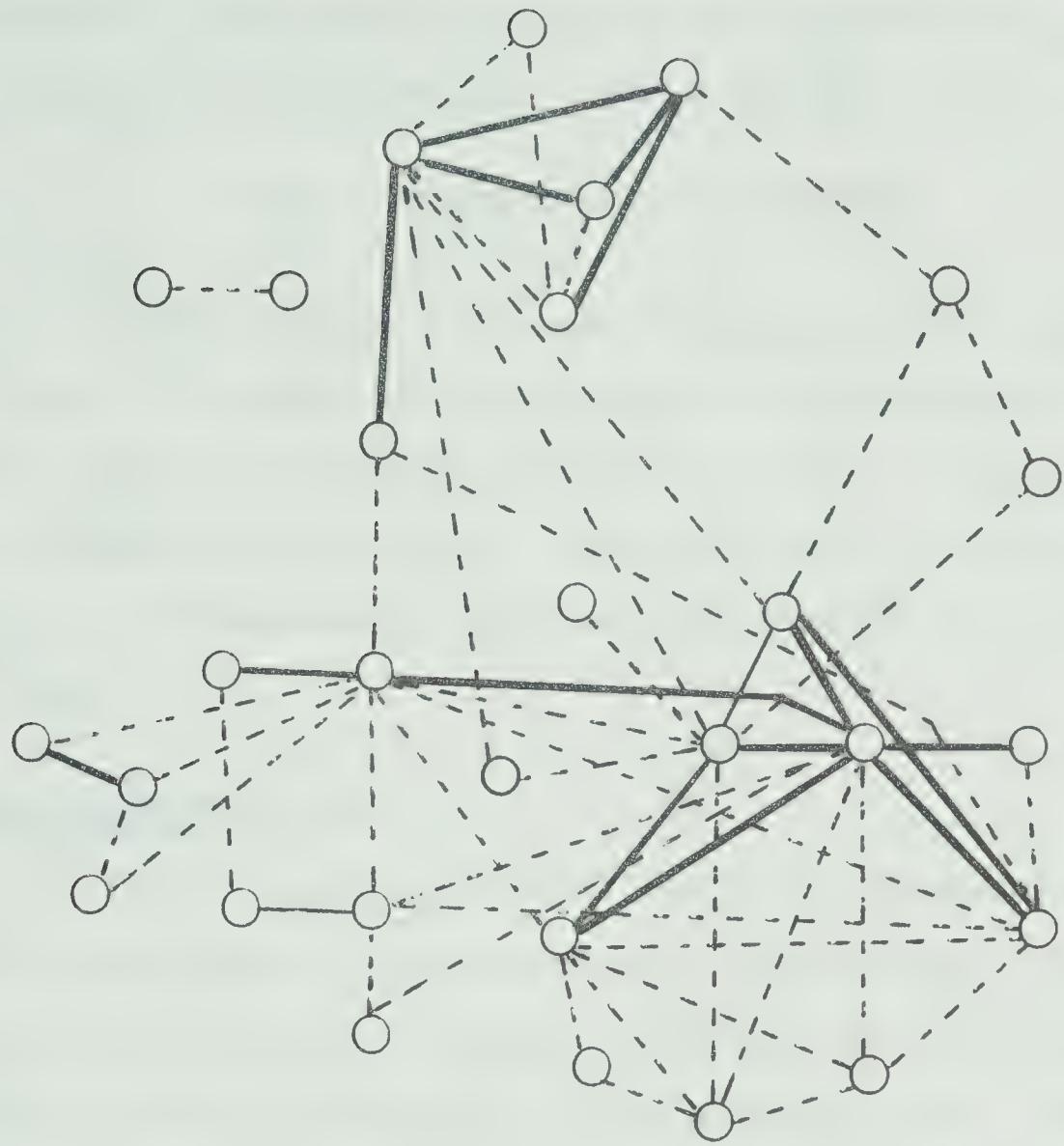
If the activities of the summer gave rise to a cohesiveness among the whole staff, it does not appear to have continued beyond the autumn. There is evidence that, later in the year some fragmentation of the relationships

⁹Supra. p. 62.

took place (Edmonds, 1970; Jensen, 1970) and inferences to support the idea of some fragmentation can be drawn from the remarks of several respondents who, speaking of their relationships with other staff members, made such comments as, "I used to see him a lot in the summer, but we haven't talked much since then."

By early 1970 the distinctively social relationships between staff members appear to have crystallised into a social structure in which two main centres can be discerned. Staff members were asked to nominate those members of the organization with whom they met socially outside the context of their work. From the responses it was possible to construct a diagram representing these relationships. This diagram is reproduced at Figure 8. Staff members are represented by circles and their nominations by lines joining the circles. Broken lines indicate that the nomination was made by only one of the two people concerned. Solid lines indicate reciprocated nominations. Persons who neither made nor received nominations are excluded from the diagram. The arrangement of the circles is such that the two distinct centres are readily seen. Whilst they are not completely separated from each other, they are not joined by any reciprocated nominations.

The group represented by the linked circles in the upper part of the diagram are all senior members of staff and include the Director and Deputy Director as well as two



— - - Unreciprocated nominations
— — Reciprocated nominations

Figure 8

H.R.R.C. In-house Staff Nominations of Social Relationships
Outside the Context of Work January 1970^a

Source: Personal interviews.

other members of the initial core staff of planners. The larger group consists, with one exception, of Research Assistants. The support staff and some secretarial staff are located in the lower left corner of the diagram.

AGE: A CHRONOLOGICAL SUMMARY

A description of the age dimension of the growth of H.R.R.C. is essentially a summary in chronological form of the elements of growth already discussed. This section will present the data in the form of a month by month synopsis. References to sources already used will not be made again.

January to April, 1969

At the beginning of 1969 the in-house staff of H.R.R.C. consisted of nine members: the Director, the Deputy Director, three Research Officers, an Information Officer, a Research Assistant and two secretaries. The initial planning phase had been completed and the formal structure of the organization was ratified by the meeting of Council on January 16th. A diagram representing the structure was subsequently published in the H.R.R.C. information bulletin in April.

The small staff occupied only a part of the building used by H.R.R.C. and worked closely with each other on the detailed planning of the project areas defined by the formal structure. During this period the relationships between staff appear to have been little different from

those of the preceding four months.

April to June, 1969

Seven new in-house staff were appointed in May and June. The new members were the Business Manager, five Research Assistants and two secretaries. The period was one of an extension of initial work in the seven program areas. Although some key senior members had not yet arrived, they were involved in this work as consultants.

July and August, 1969

Nine new in-house staff took up their appointments. Three Research Officers, one Post-Doctoral Fellow and one Doctoral Fellow arrived at the beginning of July. Three Research Assistants and one secretary arrived during the first two weeks of August.

During this period the work of the program areas got properly under way. The staff also became involved --partly as a result of the "Fisk seminars"--in questioning and re-evaluating the organization's mandate, direction and structure. The period appears to have been one in which the staff of H.R.R.C. enjoyed considerable cohesiveness and a mutual sharing of problems. One respondent referred to ". . . a glorious summer in which everybody communicated freely with everyone else" (Fisk, 1970).

Towards the end of August there was concern among some staff that the organizational structure was not facilitating their work as they had hoped, and the

Director instigated a program of reassessment within the organization.

September to November, 1969

No new research staff were appointed in September, although one secretary took up her appointment. In October and November five Research Assistants and one secretary were added to staff.

During September the two staff members who were carrying out the re-evaluation program held extensive consultations with staff. At the Red Deer retreat the more senior staff arrived at a consensus of a new organizational structure. The report of the re-evaluation process and a description of the proposed new structure were documented in October in the "Report on Forward Planning" (McIntosh and Fisk, 1969).

December 1969 to January 1970

Three Research Assistants were appointed in December. The Editor and one additional secretary arrived in January.

The new structure of H.R.R.C. was accepted by Council on December 15th and promulgated in the Director's "Memorandum to Staff." In those parts of the program which were already in existence, the new structure became operational immediately.

An Overview of Twelve Months

Between mid-January 1969 and mid-January 1970 changes took place within H.R.R.C. The changes occurred in

the context of an increasing staff size and a continuing appraisal of the mandate, the direction and the structure of the organization.

Two kinds of change are of interest here: those related to the formal structure of H.R.R.C. and those related to its informal structure. The formal structure which had been established by January 1969 proved unsatisfactory and was subject to intensive examination before being replaced by a different structure at the end of the year. The informal structure of relationships between staff appeared to have an initial solidarity which was slightly fragmented by the arrival of new staff, but renewed in the summer as all staff showed a common concern for a discussion of organizational problems. After the summer the informal structure seems to have become fragmented as new relationships, both social and task oriented, formed among the larger staff.

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CHAPTER 5

COMMUNICATIONS IN H.R.R.C.

The method employed for the analysis of the communication networks in H.R.R.C. was outlined in Chapter 3. The present chapter will present the results of the analysis at five periods: April, June, August and Fall 1969 and January 1970. For each period four analyses were made: one for each type of communication (work, organization and in-depth social) and one for all types combined. In the latter analysis only those links were considered which existed in all three types of communication. Mathematically expressed, this analysis was of the product of the three communication matrices not of their sum.

The graphic display of the findings which accompanies the text is in the form of sociograms. The disadvantage of the sociogram is that its interpretive reliability is low; that is, any two investigators may, given the same data, draw very different sociograms by virtue of the fact that they may individually choose how to arrange their subjects in the sociogram. The present sociograms are intended for visual comparisons of data at different periods and for different kinds of communication. Accordingly, they have been standardized so that the arrangement of people (represented by identification number) is the same in all the sociograms presented here. If

changes in communication patterns are apparent they will be apparent in the changed arrangement of lines in different sociograms.

At no two of the five selected times was the number of respondents the same, so that identification numbers in the earlier sociograms are more widely spaced than in the later ones which represent the interaction between more people. The sociogram design was derived from a consideration of the communication links existing in the largest work communication matrix (January 1970) and was based on criteria of centrality and connectedness, so that persons with the greatest number of links were placed towards the centre of the sociograms and persons who tended to be linked more with each other than with anyone else were placed near to each other in the sociogram.

Apart from its accompanying sociograms the text refers to the first-power and cubed matrices and analyses of clique membership. The matrices are not reproduced, but some tables of clique membership are located in Appendix C.

Communications in April 1969

Nine respondents were on staff in April 1969. The sociograms representing their communication networks are shown at Figures 9, 10, 11 and 12.

Work communication. Inspection of Figure 9 shows that one staff member (person 1) was more isolated than anyone else and that person 17 was relatively isolated. Both

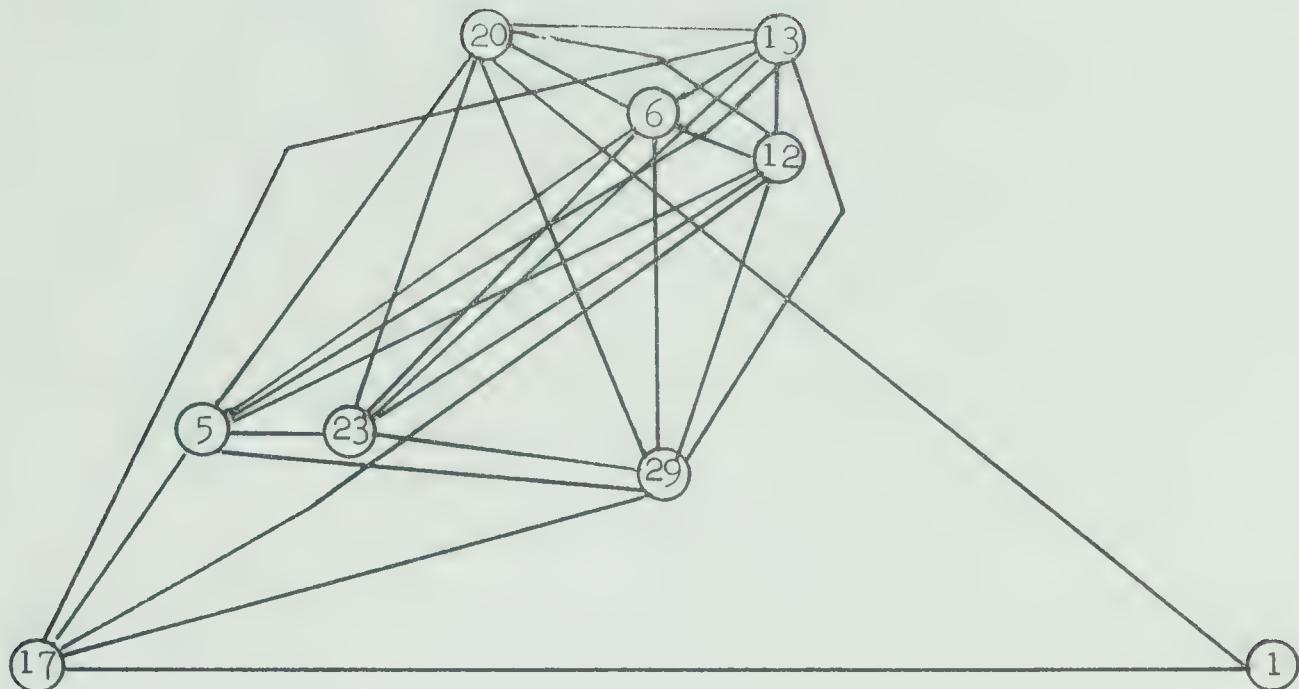


Figure 9
April 1969: Work Communication

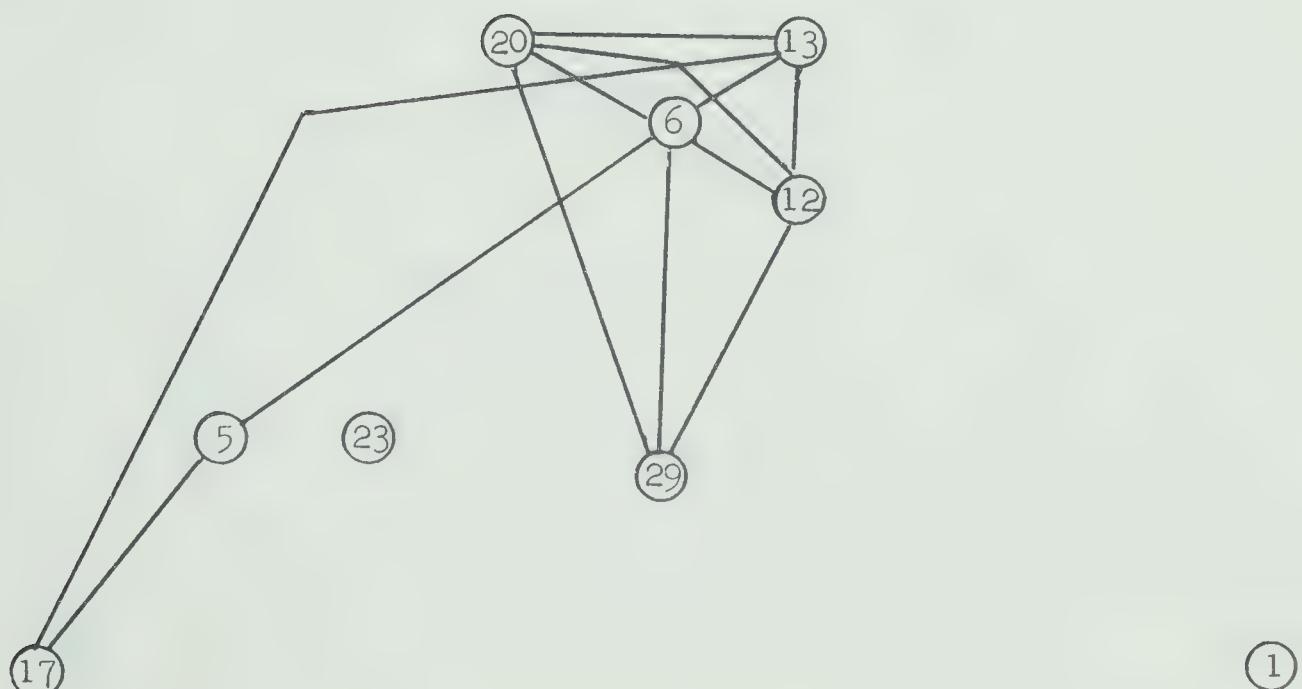


Figure 10
April 1969: Organization Communication

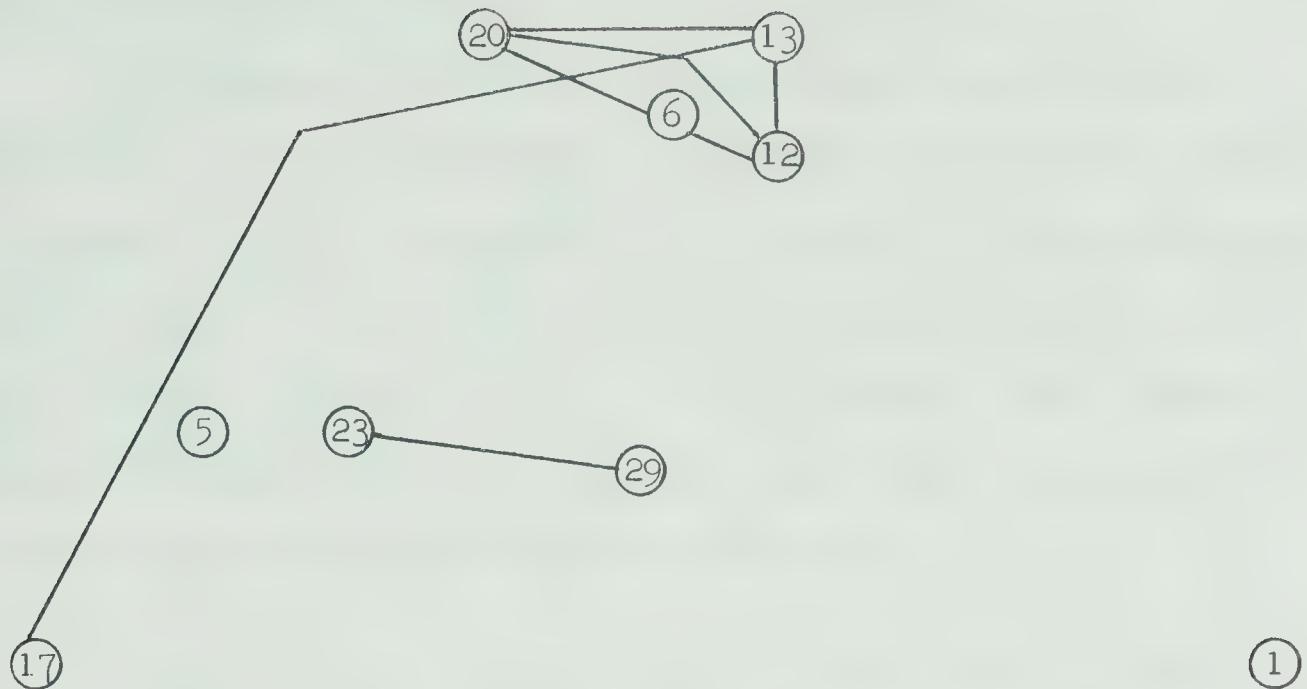


Figure 11

April 1969: In-depth Social Communication

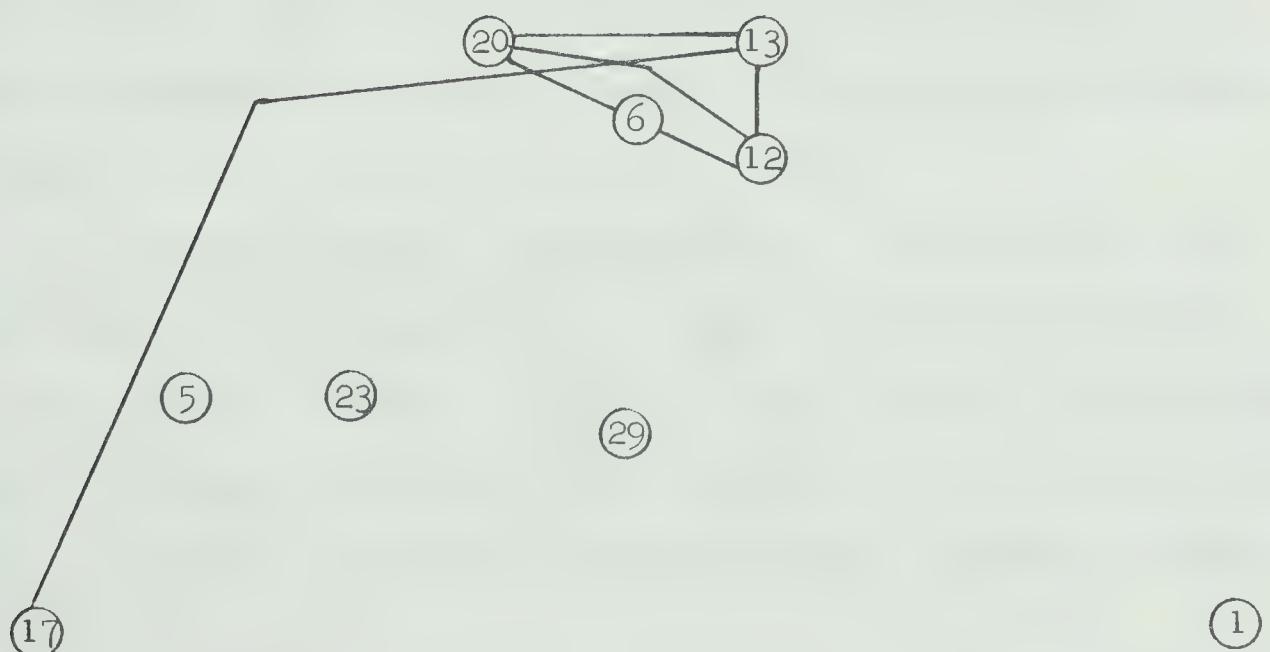


Figure 12

April 1969: All Types of Communication

these staff members were research assistants.

An examination of the cubed matrix shows a high degree of interconnectedness. The maximum possible number of cliques for any one person in a group of nine members is twenty-eight.¹¹ No member except person 1 belonged to less than fifteen. Persons 5, 12, 13 and 29 were each members of eighteen cliques and were thus the most involved members of the work communication clique structure.

Organization communication. There were no reciprocated reports of organization communication from one secretary and one Research Assistant.

Although the seven other members were all involved, the degree of their involvement varied. The cubed matrix shows that four staff did not feature in any cliques. Of the five who did, three were in five cliques and two in three. Persons 6, 12 and 20 were the most involved members of staff.

In-depth social communication. Seven of the nine staff reported reciprocated in-depth social communication. Of these seven, persons 12 and 20 were the most central in terms of clique membership and belonged to two cliques each. Persons 6 and 13 were each members of one clique and person 17

¹¹The maximum number of cliques to which any one person could belong in a group of size N is $(N - 1) \cdot (N - 2)$. However, this considers the clique A → B → C → A as different from the clique A → C → B → A. Such a distinction seems meaningless in the present context and the maximum number of cliques for any one person is thus here considered as

$$\frac{(N - 1) \cdot (N - 2)}{2}$$

was relatively isolated. Persons 23 and 29 had links only with each other.

The sociogram (Figure 11) clearly shows a core clique of persons 6, 12, and 20 with person 13 being connected to two members of the clique. Person 17 was connected only indirectly through person 13.

All types. In April 1969 the product of the matrices for each type of communication was the same as the matrix for in-depth social communication, with the exception of the link between persons 23 and 29.

Summary. In the small staff of H.R.R.C. in April 1969 several members, although involved in work communication with the rest of the staff, did not form part of an all-inclusive network. An examination of the clique structures in all matrices showed the existence of a core group which featured in all types of communication.

Communications in June 1969.

The sociograms representing the communications within H.R.R.C. in June 1969 are shown at Figures 13, 14, 15 and 16. Thirteen respondents were on staff at this time --an increase of four since April.

Work communication. Although no member of staff reported less than two reciprocated communication links, an examination of the clique structure in the cubed matrix revealed a wide range of involvement. The greatest number

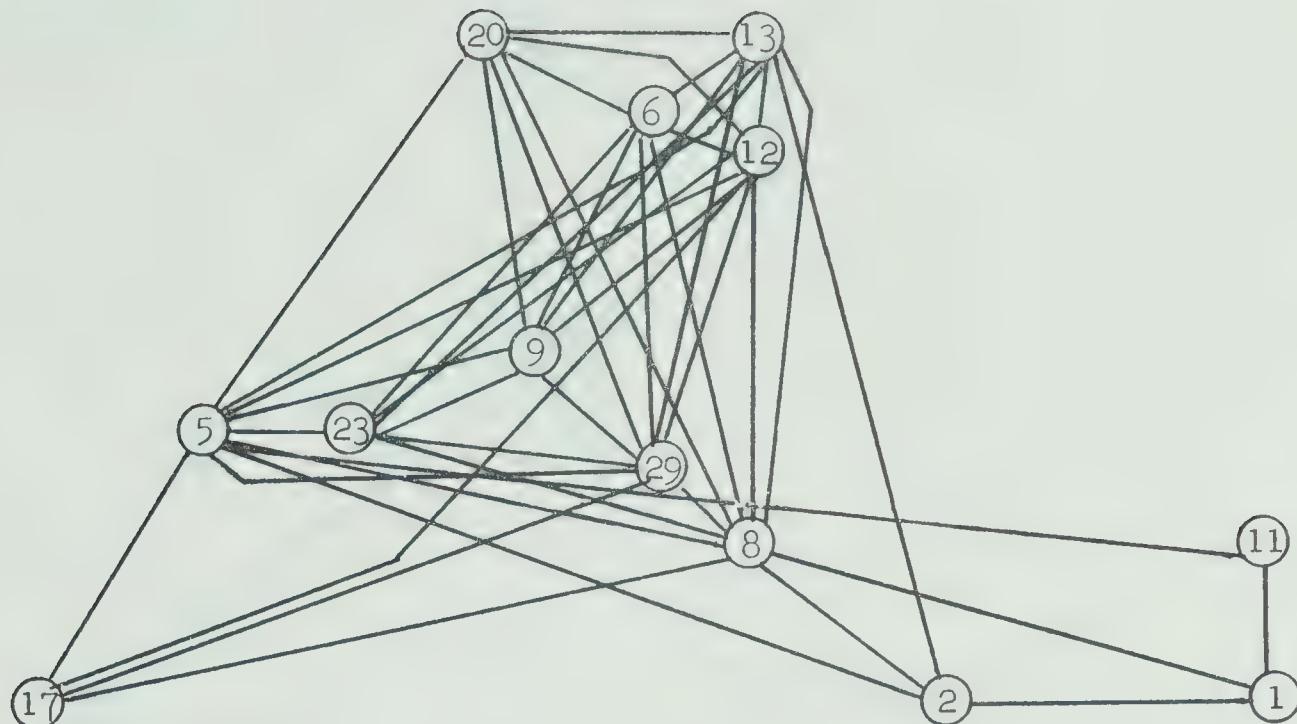


Figure 13

June 1969: Work Communication

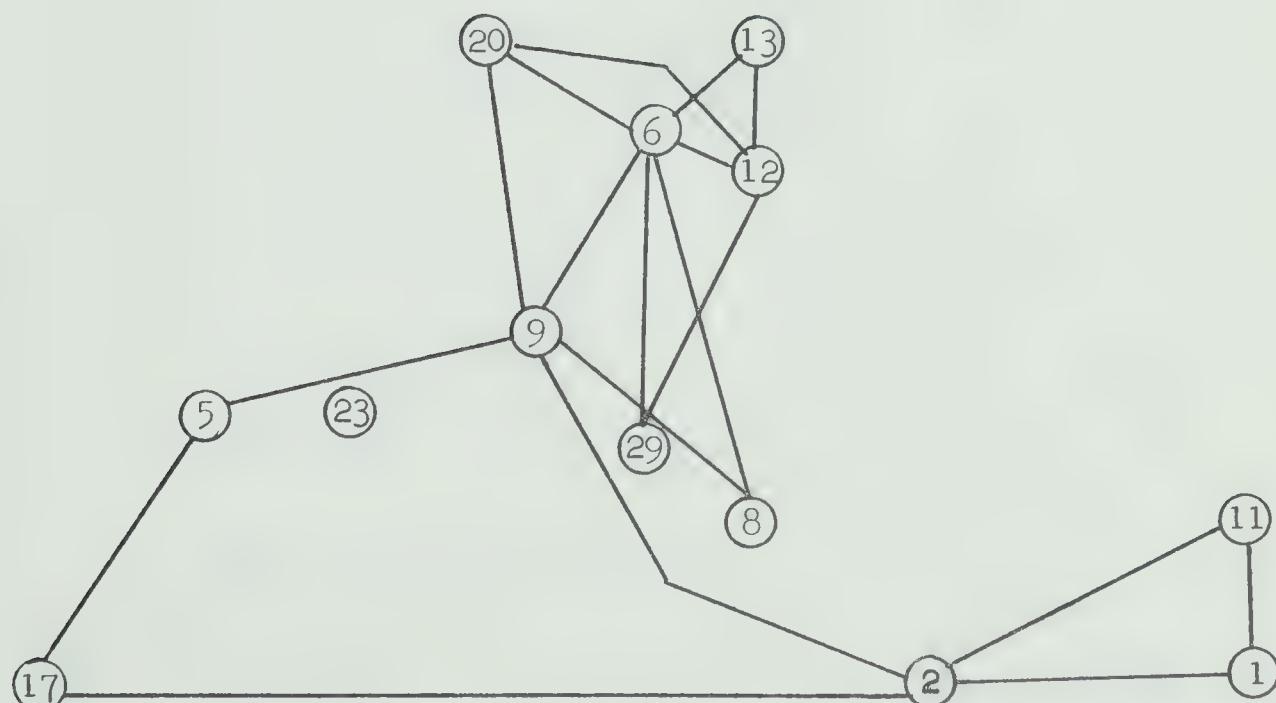


Figure 14

June 1969: Organization Communication

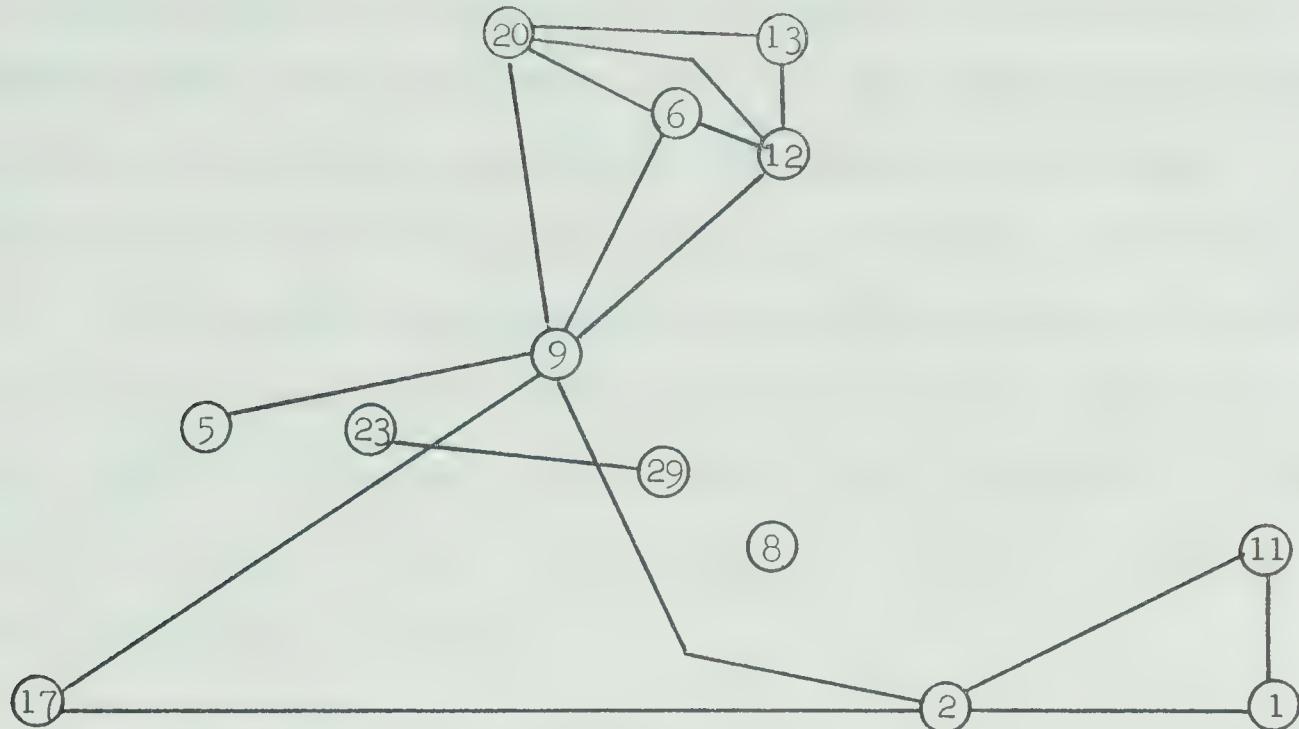


Figure 15

June 1969: In-depth Social Communication

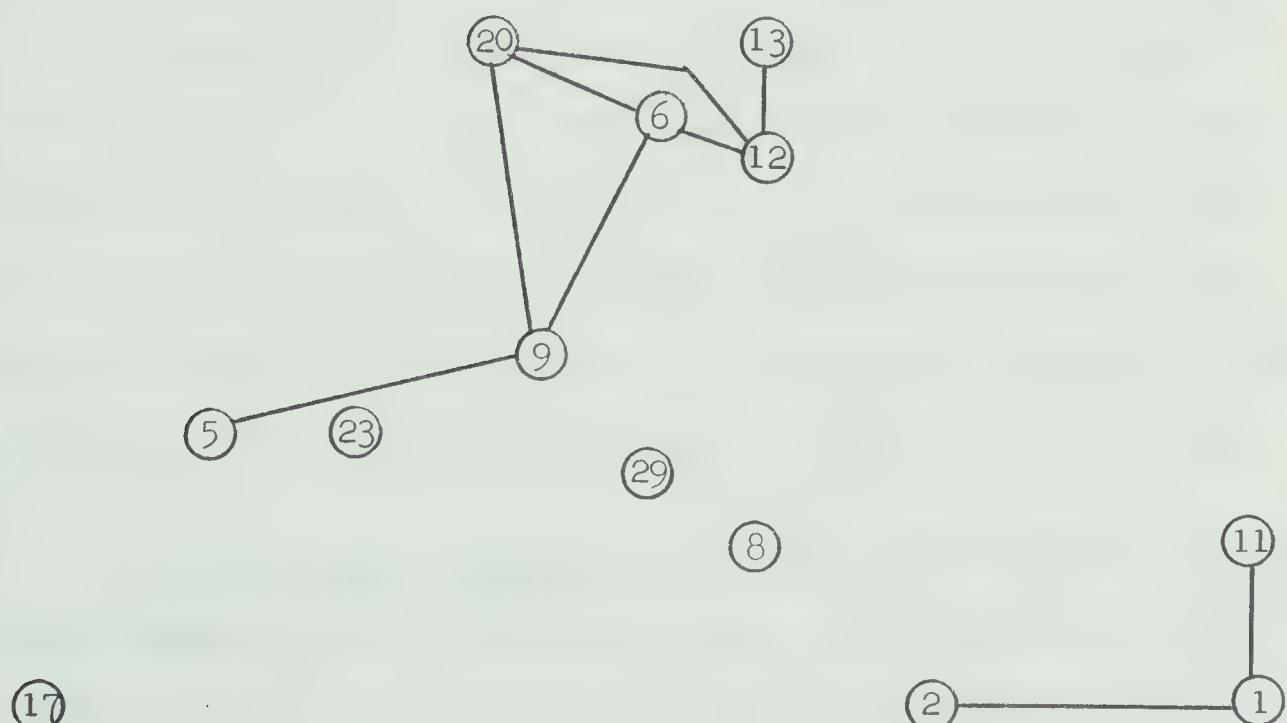


Figure 16

June 1969: All Types of Communication

of 3-step links from any one person back to himself was twenty-eight. Four people (8, 12, 13, 29) had twenty-five or more. One person (person 11) featured in no clique. Person 1 featured in only one clique and person 2 in four.

Of the four new members, two were involved in fairly central positions in the communications network (persons 8 and 9) and two (persons 2 and 11) were more peripheral. The presence of these latter two, however, decreased the former isolation of person 1.

Organization communication. Twelve of the thirteen respondents indicated organization communication links which were reciprocated.

The communication links, however, were far from evenly distributed. From the cubed matrix it could be seen that the number of cliques to which each person belonged ranged from zero to five. The most central person by this criterion was person 6, and persons 12, 9 and 20 were the next most heavily involved. Three persons belonged to no clique (persons 23, 17, 5) and the remaining six people each formed part of one of four different 3-person groupings.

In-depth social communication. Twelve staff reported in-depth social communication links which were reciprocated. The non-communicator in in-depth social communication was a different person from the non-communicator in the organization communication.

Persons 6, 9, 12, 20 belonged to the highest number

of cliques and clearly interacted with each other more than with any one else. Person 9 served a linking function. He was a member of the major clique structure but was also a member of one separate clique as well as a link between the major clique and the clique formed by persons 1, 11, 2.

All types. An examination of which persons reported reciprocated communication of all three kinds revealed a core communication structure consisting of persons 6, 9, 12, 20 with persons 13 and 5 on the fringe of the core. Also revealed were the relationships between persons 1 and 2, and 1 and 11. These people did not form a clique but neither were they connected with any other staff members.

Summary. The addition of new members to the communications network in H.R.R.C. greatly increased the number of paths of work communication. More paths were also open to communication about the organization and about in-depth social topics. An examination of the clique structure revealed the continuing dominance of a few people but also the emergence of a small number of separate cliques marginally connected with the major group.

Communications in August, 1969

The communications in H.R.R.C. in August 1969 are represented in the diagrams at Figures 17, 18, 19, 20 and 21. The number of respondents involved rose to twenty-one.

Work communication. With the addition of eight

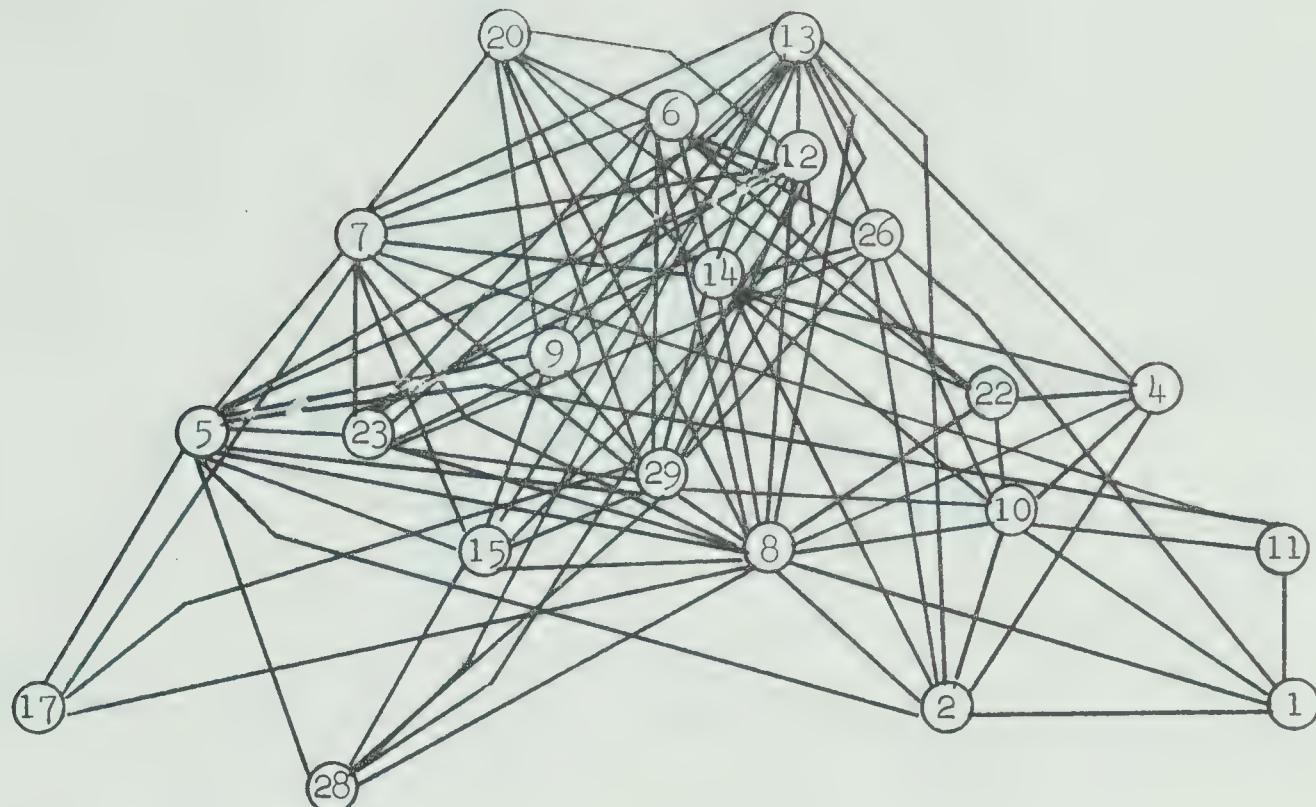


Figure 17

August 1969: Work Communication

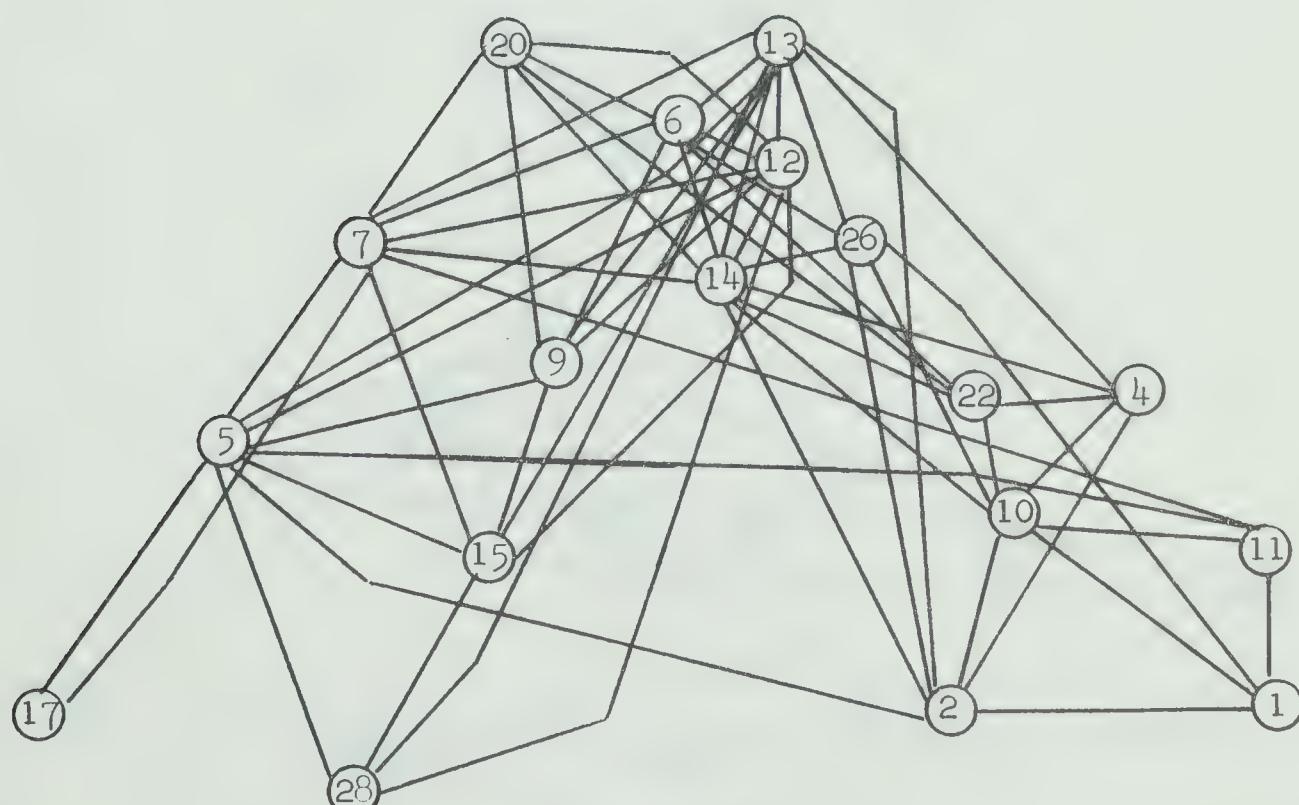


Figure 18

August 1969: Work Communication
(Support and Secretarial Staff Removed)

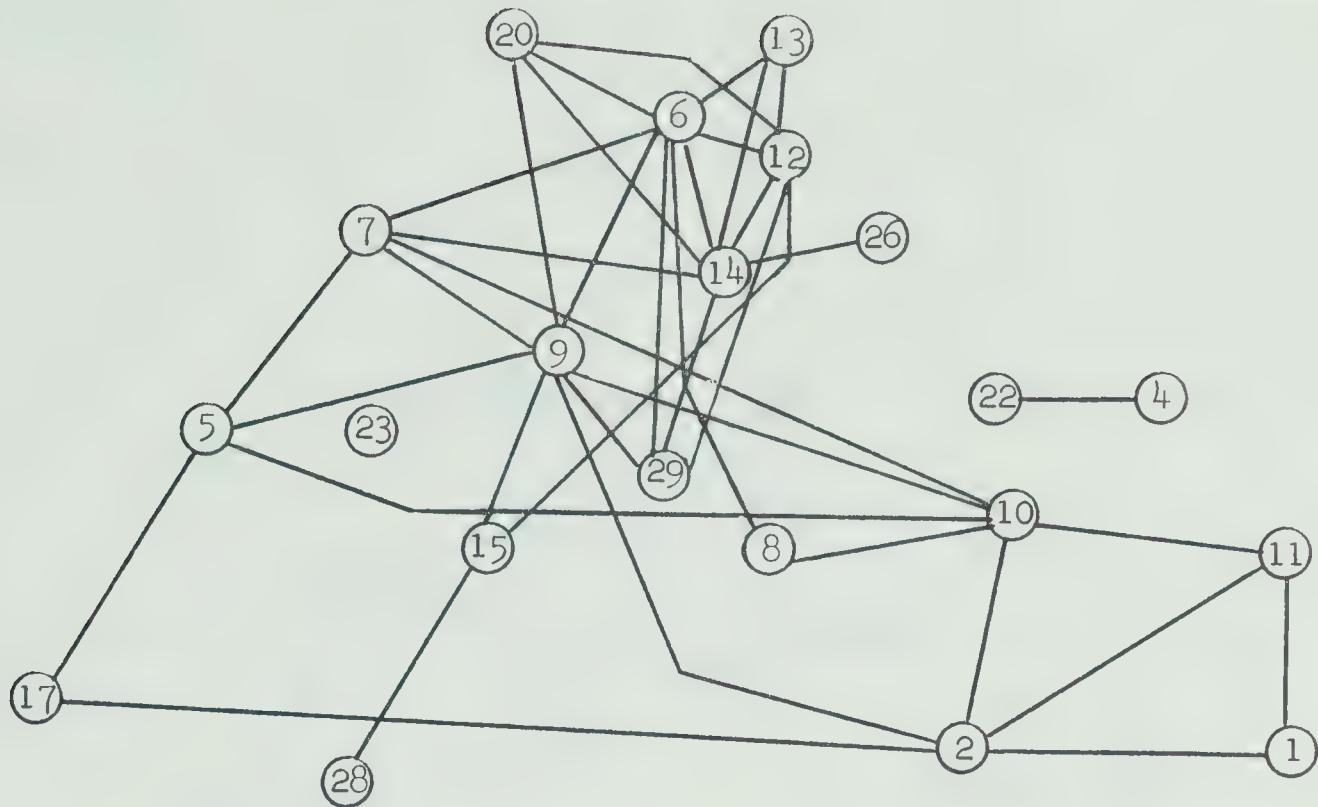


Figure 19

August 1969: Organization Communication

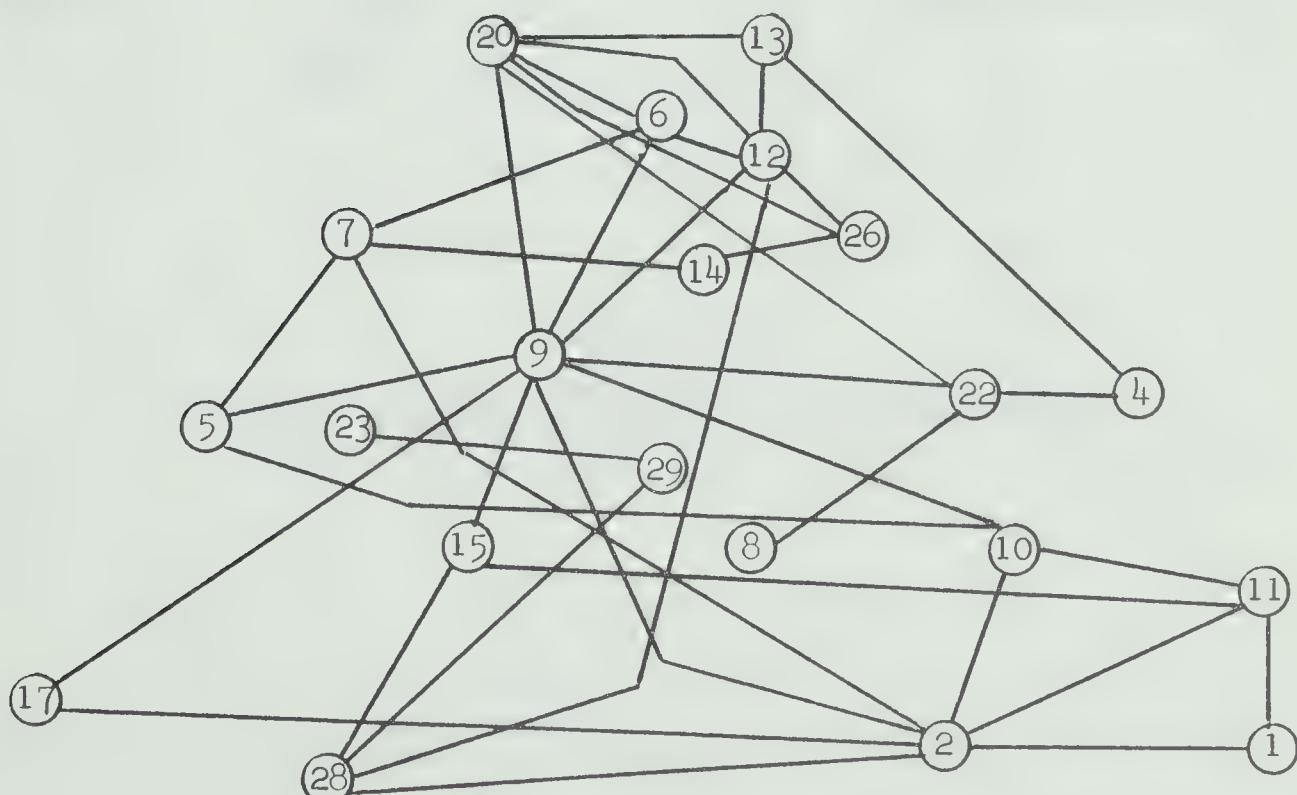


Figure 20

August 1969: In-depth Social Communication

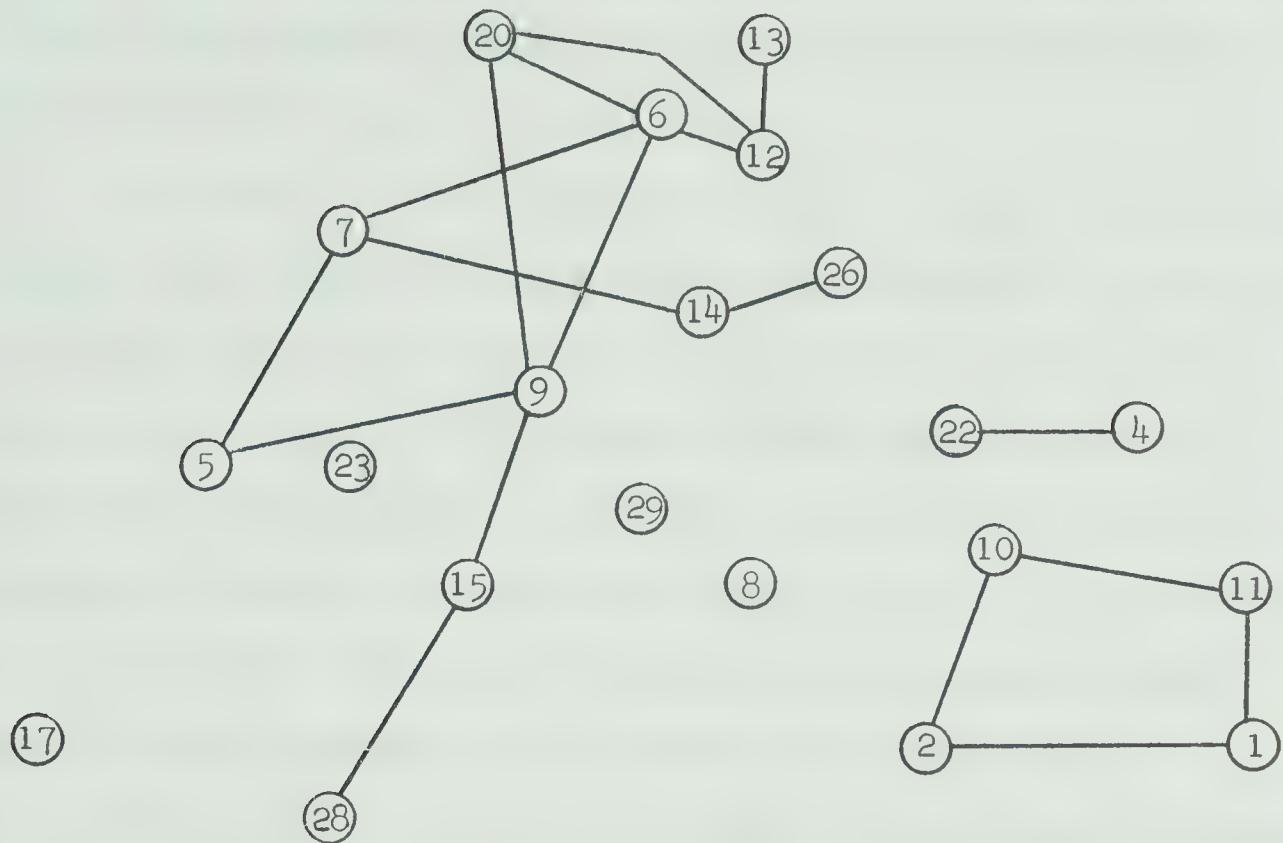


Figure 21

August 1969: All Types of Communication

people, the paths of work oriented communication became a very complicated network. No person had less than four reciprocated links and eight people (persons 5, 6, 7, 8, 12, 13, 14, 16) had more than ten. The cubed matrix showed that only one person (person 11) was a member of less than six cliques and three people (persons 8, 13, 29) were members of more than fifty such groups.

In order to increase the clarity of the diagram of work communication, it is presented in Figures 17 and 18 in two forms. The first represents all reciprocated work communication links; the second excludes all links with secretarial and support staff who, by the nature of their work were linked to most other people in the organization as well as to each other, and of whom two (persons 8 and 29) were in more cliques than any other staff member.

The second of these diagrams gives a clearer picture of the way in which the work communication paths clustered. A heavy concentration of lines is seen in the area of persons 7, 6, 9, 12, 13, 14, 20, and lighter concentrations in the lower parts of the diagram. The clustering is, however, relative, and only person 17 has links with less than four people.

Organization communication. At this period all staff except one reported reciprocated links of communication about the organization. The number of links, however, was far smaller than in the case of work communication and an examination of the clique structure becomes more

meaningful.

Eight people (persons 4, 8, 15, 17, 22, 23, 26, 28) were not members of any clique, whilst six members (persons 6, 7, 9, 10, 12, 14) belonged to five or more cliques. These cliques whilst they all overlap, can be broken down into two basic clusters. By taking each of the six persons involved and listing the cliques of which he was a member, it is possible to see which persons were common to several cliques. It is also possible to see the extent to which they belonged to more than one clique. From such an analysis it can be determined which people were most frequently members of the same cliques and, conversely, which people were never members of the same clique.

Examined in this way the major clique structure within the pattern of organization communication was seen to have centred round two groups of people: persons 6, 12, 14 and persons 7, 9, 10. The analysis also clearly showed that persons 7 and 9 were the links between these two groups.

In-depth social communication. All staff members reported in-depth social communication links which were reciprocated. Eight people (persons 4, 7, 8, 14, 15, 23, 28, 29) were member of no clique. Six people belonged to at least three cliques. As in the case of organization communication, the cliques tended to cluster into two groups. The groups, however, were rather different and their core members were persons 6, 12, 20 on the one hand, and persons 10 and 2 on the other. Person 9 was a strong link

between the clusters.

All types. Isolation of only those members who were linked by all three kinds of communication showed again the interrelatedness of the initial core group--persons 6, 12, 20--and revealed the constant links between them and other members. Those members (persons 10 and 2) who, in the analysis of organization and in-depth social communication appeared to form the nucleus of a different clique structure, were seen not to have formed a constant clique, but to have been generally associated with each other and with persons 1 and 11.

Summary. The number of paths of communication increased greatly during this period with the increase in staff size. The great number of overlapping cliques to which many members belonged made the analysis of work communication clique structures unrewarding. In the analysis of organization and in-depth social communication, however, the major clique structures clustered into two sets of cliques joined by a few linking people. The major set of cliques involved persons 6, 12, 14 and 20.

Communication in the Fall 1969

Figures 22 to 26 show the diagrams representing the communications in H.R.R.C. in the Fall of 1969. Five respondents had joined the organization since August and the diagrams represent the reciprocated communications of twenty-six staff. As in the case of the analysis of the

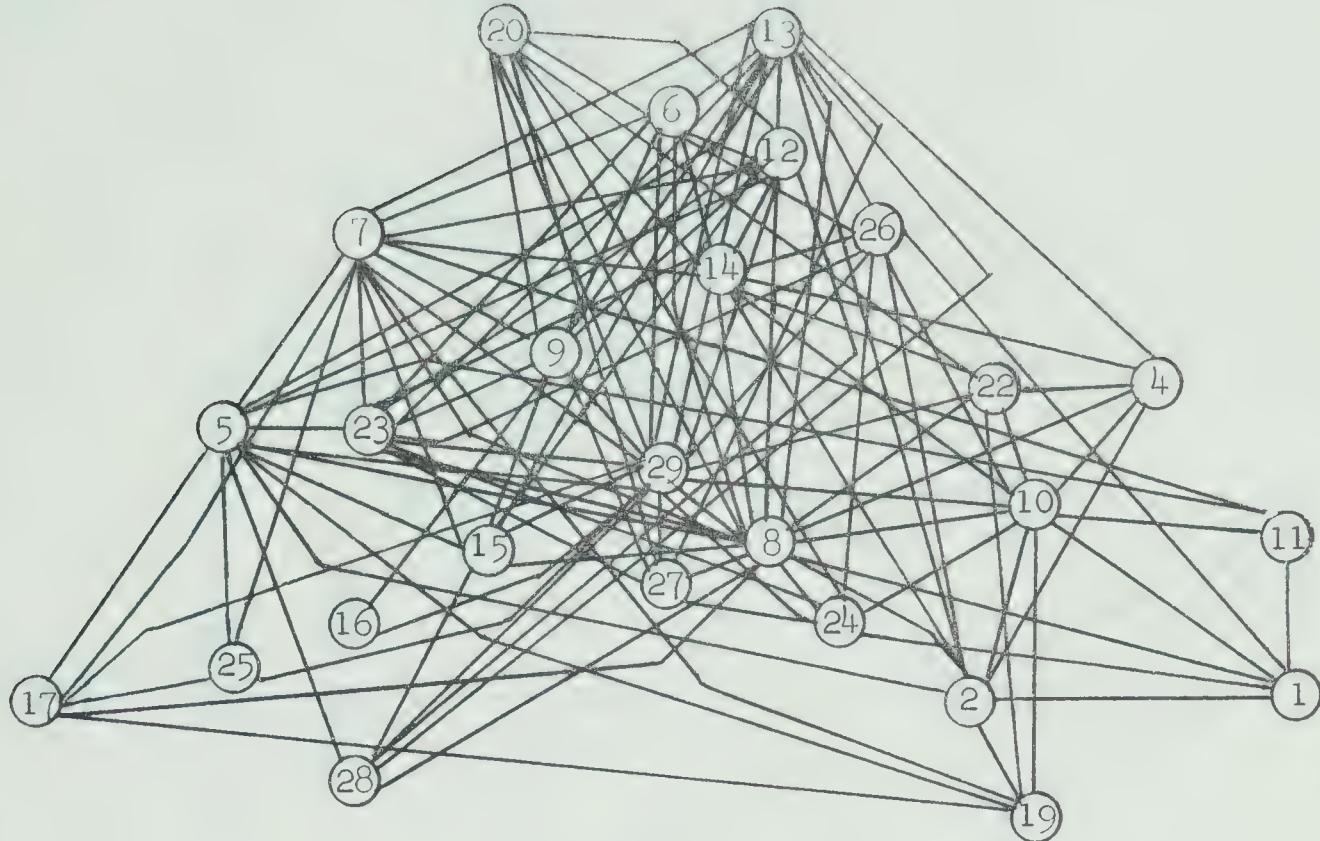


Figure 22

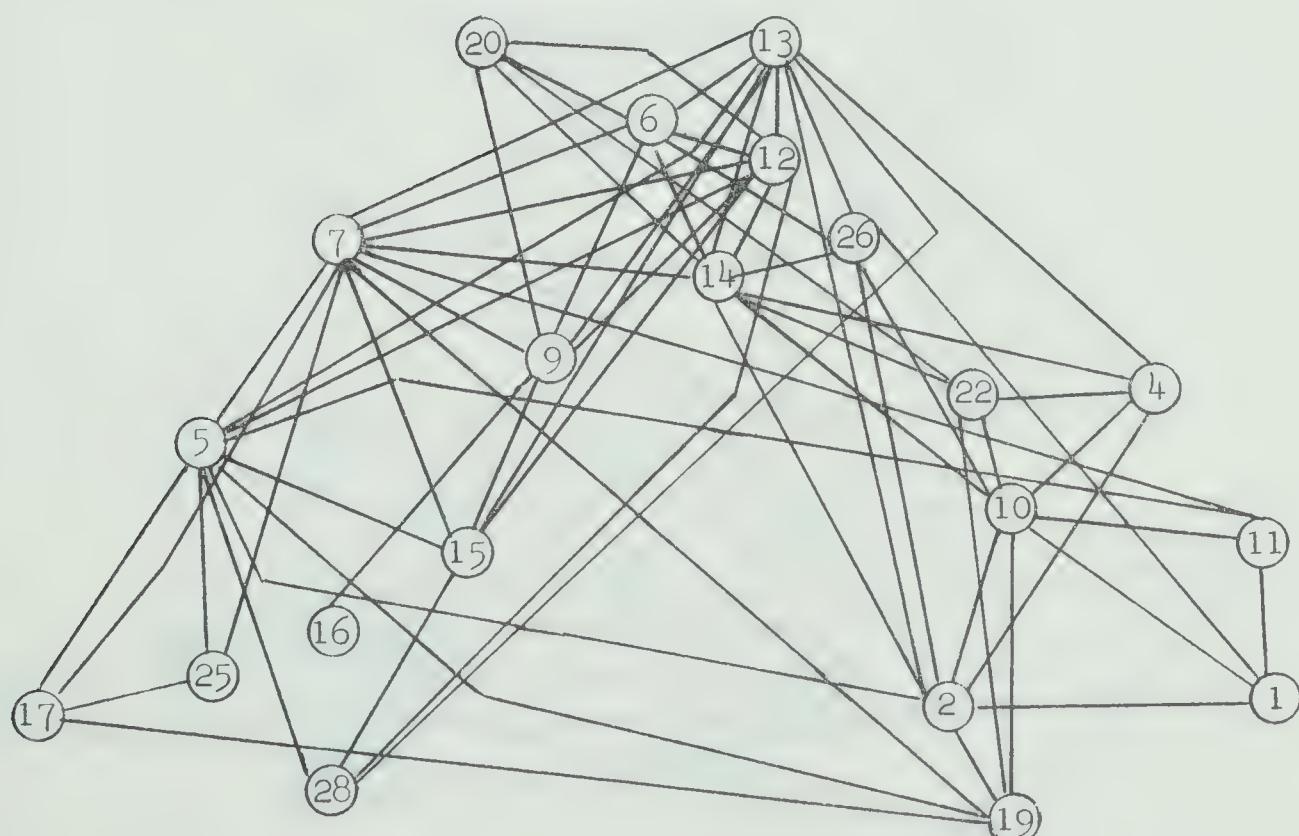


Figure 23

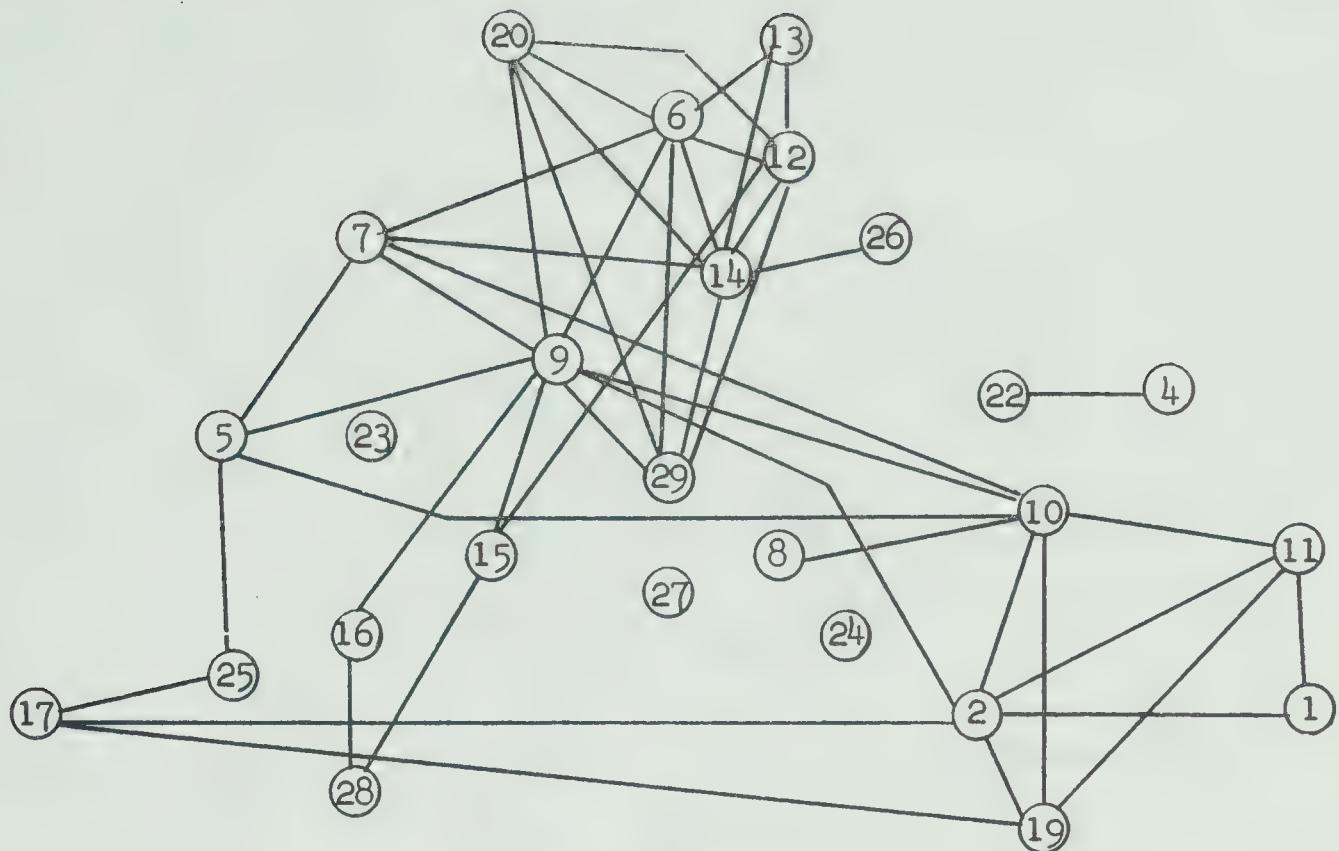


Figure 24

Fall 1969: Organization Communication

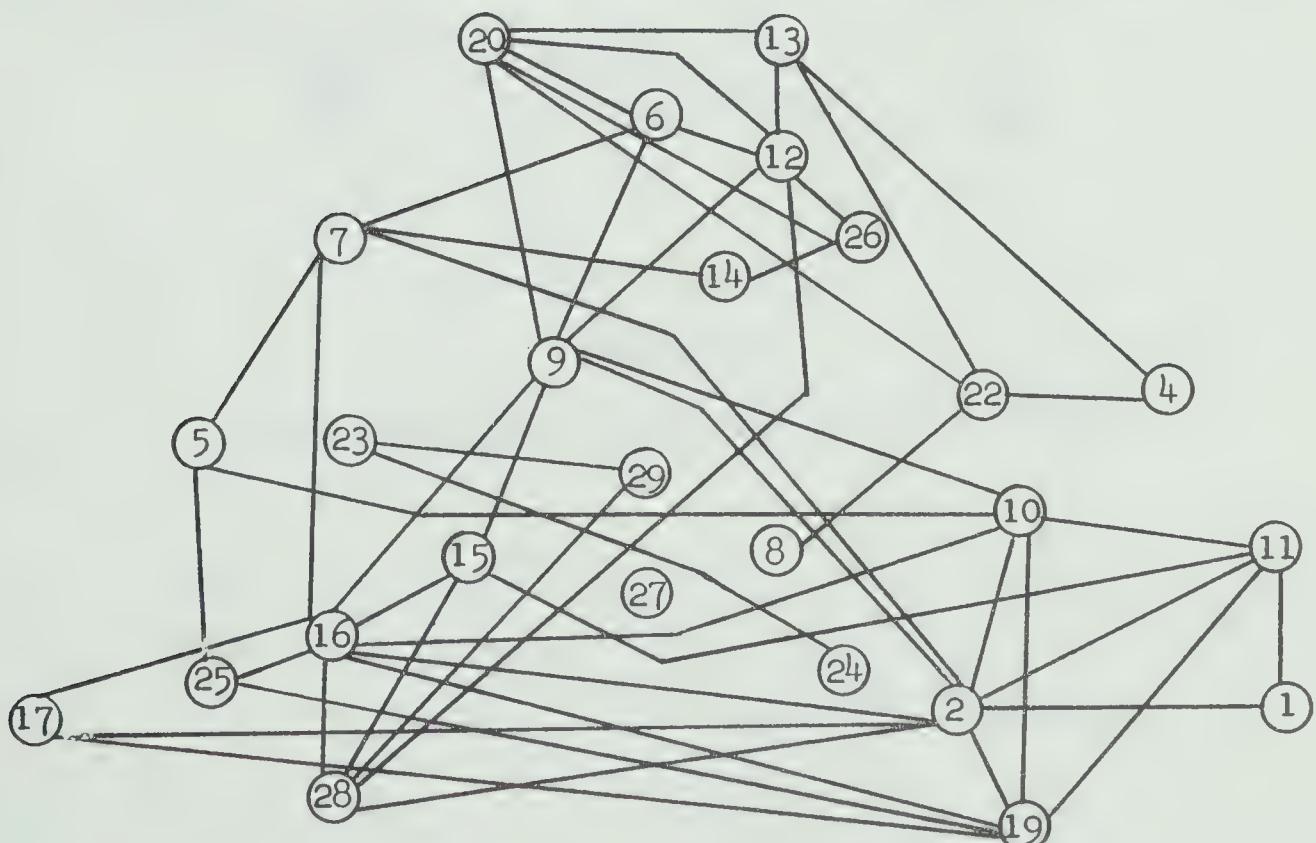


Figure 25

Fall 1969: In-depth Social Communication

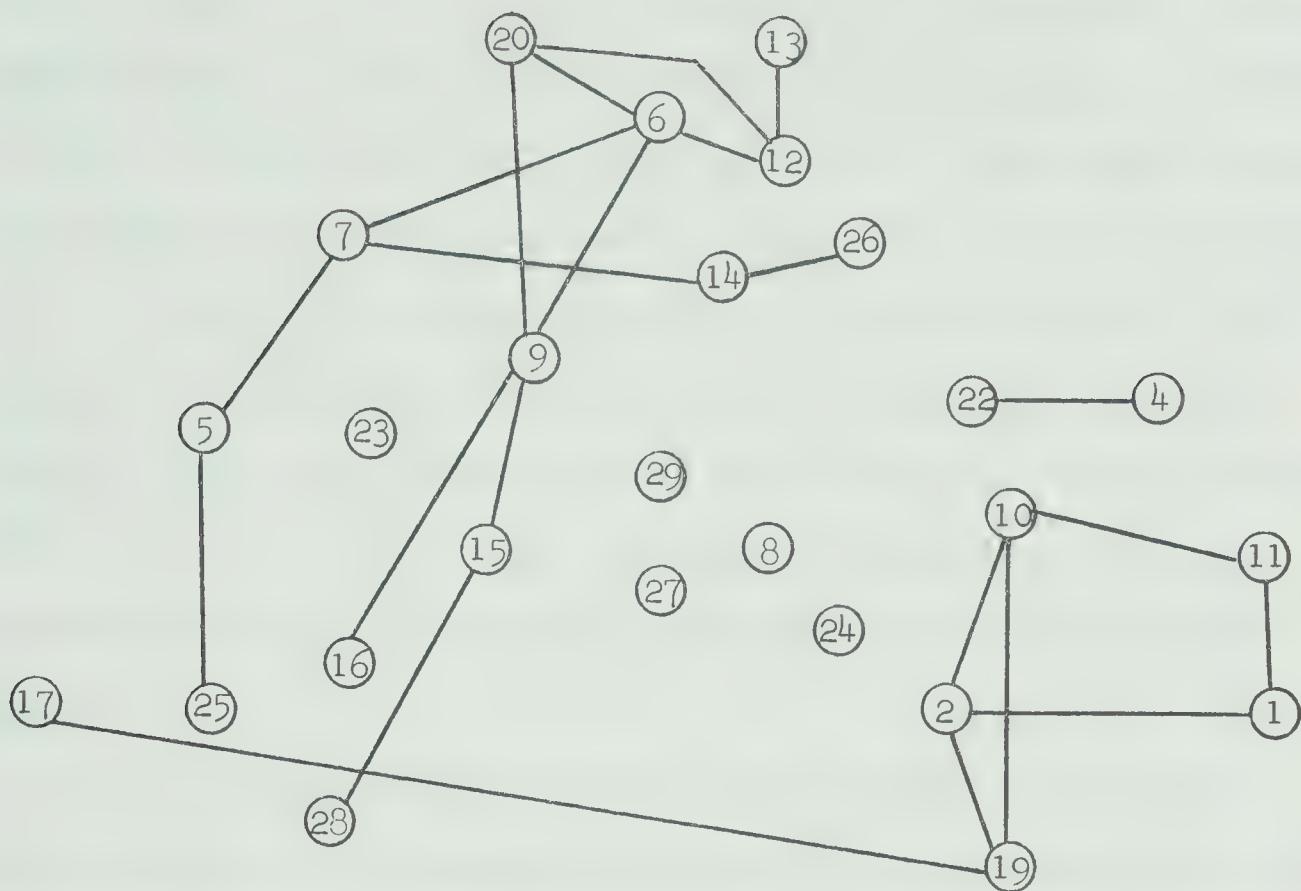


Figure 26

Fall 1969: All Types of Communication

August communication patterns, a simplified diagram of the work communication is shown in which the secretarial and support staff have been removed.

Work communication. All staff were included in the large number of overlapping cliques in the network of work communication. Three new Research Assistants were included in less cliques than most people, but two new secretaries were members of seventeen and sixteen cliques respectively.

A slight change since August was revealed by the analysis of clique structure. When the secretarial and support staff were removed from the analysis, it was found that persons 7 and 5 were separated from the cliques of persons 6, 12, 13 and 14, and that persons 12 and 13 were links.

In an attempt to assess the influence of these core members--all Research Officers or above--they, as well as the secretarial and support staff were removed from the analysis. It was found that no cliques were formed and that communication tended to be between Research Assistants who shared an office or who worked in the same project area.

Organization communication. Three secretarial staff had no reciprocated links of communication about the organization. All other staff reported at least one link and, again, a clique structure emerged.

An examination of the cubed matrix showed that eleven staff (persons 4, 8, 15, 16, 22, 23, 24, 25, 26, 27, 28) were not members of any clique and that eight

(persons 2, 6, 9, 10, 12, 14, 20, 29) were members of more than five cliques. An analysis of clique membership showed that major clique sets again clustered into two groups similar to those of the August clique structure.

In the Fall, however, the groups of cliques were slightly different. More people were involved as key members and the links between groups were not so strong. One set of cliques centred on persons 6, 12, 14, 20 and, rather less, person 29. The other centred on persons 2 and 10. Persons 9 and 7 still functioned as links to some extent, but were more closely identified with the smaller clique set.

In-depth social communication. One secretary reported no in-depth social communication links which were reciprocated. All other staff members reported at least two such links, with the exception of person 8 for whom there was only one.

The diagram at Figure 25 shows a concentration of horizontal lines in the lower half which was absent in Figures 9 - 24 and an examination of the clique structure in it is interesting.

The cubed matrix showed that each of six people (persons 2, 9, 10, 16, 19, 20) were members of more than five cliques. This contrasts with the above analysis of organization communication in which person 16 was a member of no cliques and person 19 of four.

An analysis of clique membership again showed two

sets of cliques. Persons 12 and 20 (and, to a lesser extent, person 6) were key figures in one set and persons 2, 10, 16 and 19 in the other. Person 9 linked the two sets.

All types. Persons linked by all types of communication in the Fall still included members of the initial core group of H.R.R.C., together with eight other people. It was noticeable that the new member, person 19, with links to persons 2 and 10 caused the formation of a constant clique within the small group of people who were separated from the initial core group.

Summary

Although the patterns of work communication in the Fall of 1969 were similar to those obtaining in August, analysis of organization communication and in-depth social communication showed increasingly the formation of two sets of cliques. The sets differed in each type of communication. In organization communication the larger set evolved around persons 6, 12, 14, 20 and 29, whereas these persons, on the whole, belonged to the smaller set in in-depth social communication. The larger set in the area of in-depth social communication centred on persons 2, 10, 16, and 19. Person 9 continued to be a link between the two sets of cliques.

Communications in January 1970

The internal communications of H.R.R.C. in January 1970 are represented by the diagrams in Figures 27

to 31. Three respondents were new to the organization since the Fall and the diagram therefore represents the communications between twenty-nine members of the in-house staff. Work communication is again represented by two diagrams, in the second of which the support and secretarial staff have been omitted.

Work communication. Again, in the large number of communication paths between the twenty-nine respondents, a great many overlapping cliques were formed. The Business Manager and the Information Officer, whose work brought them into contact with all areas of the organization, were members of eighty-three and eighty-one cliques respectively and the Editor, who joined the organization at the beginning of January, was a member of thirty-three cliques. Three relatively isolated staff members each belonged to fewer than seven cliques, but other staff belonged to between ten and sixty-two cliques.

An analysis of clique membership showed that persons 8 and 29 served as almost universal links between cliques. When their influence was removed, persons 6, 12, 13, 14, 26 and, to a lesser extent, persons 7 and 5 were seen to have been key people in the clique structure of work communication. When the network was examined without either secretarial and support staff or these core Research Officers, it was found that no cliques were present and that links tended to cluster between Research Assistants who either shared an office or worked in the same project area.

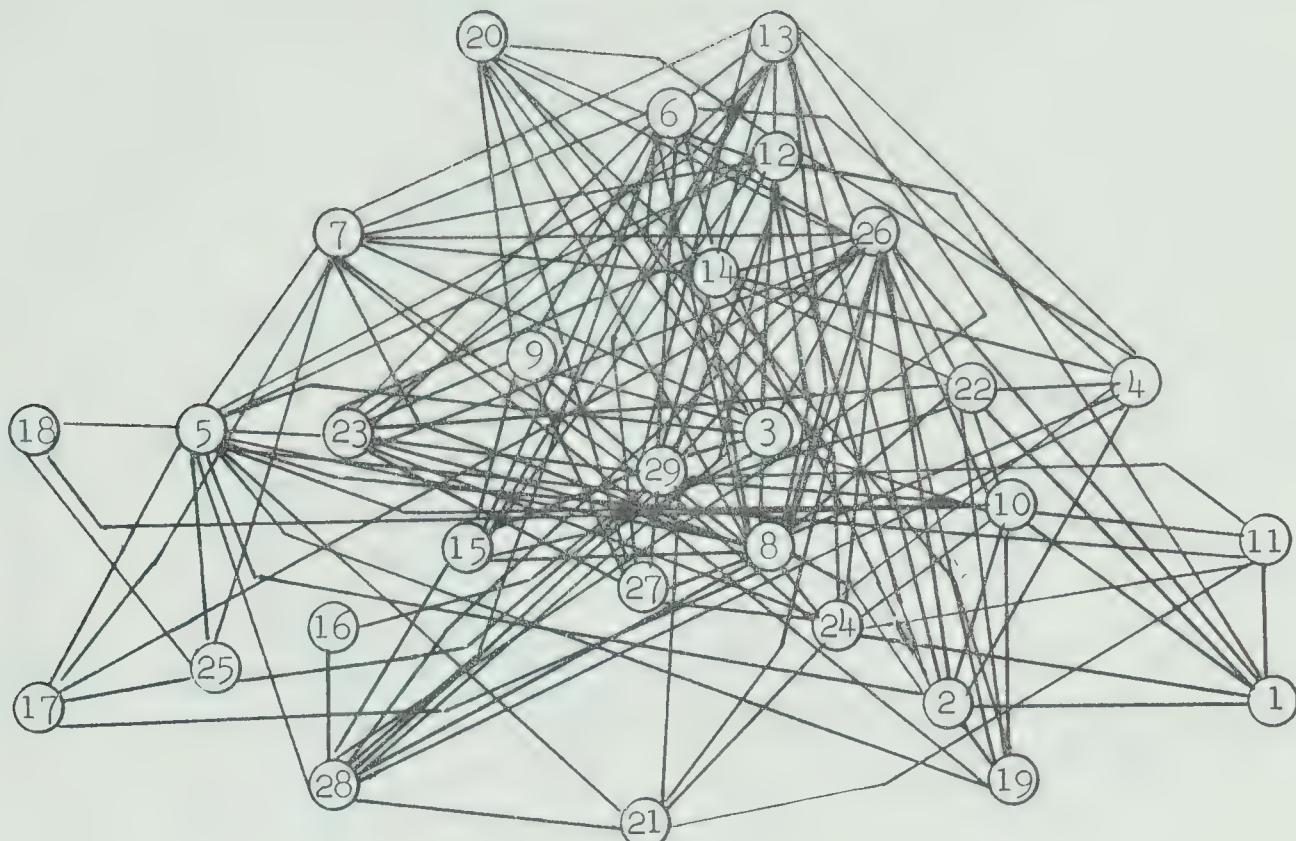


Figure 27
January 1970: Work Communication

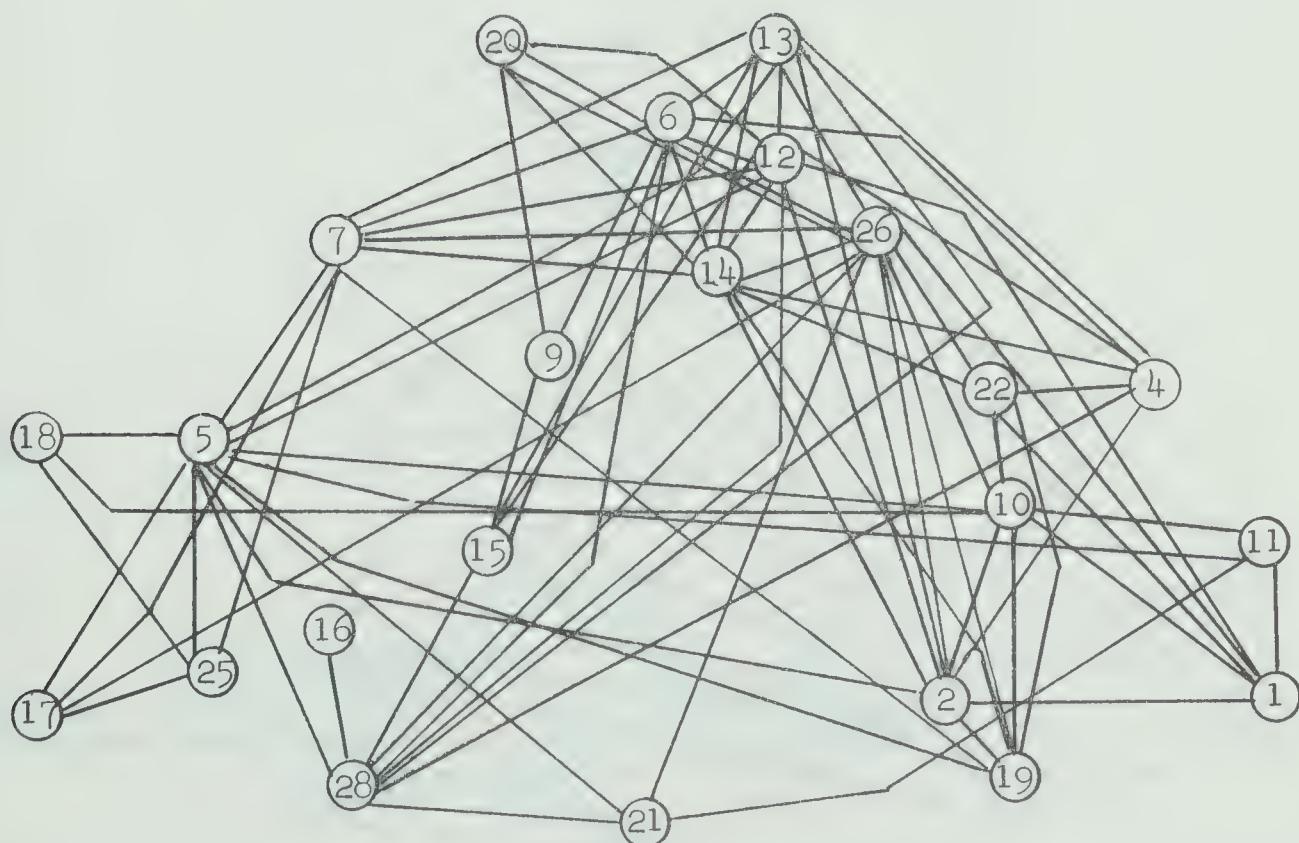


Figure 28
January 1970: Work Communication
(Support and Secretarial Staff Removed)

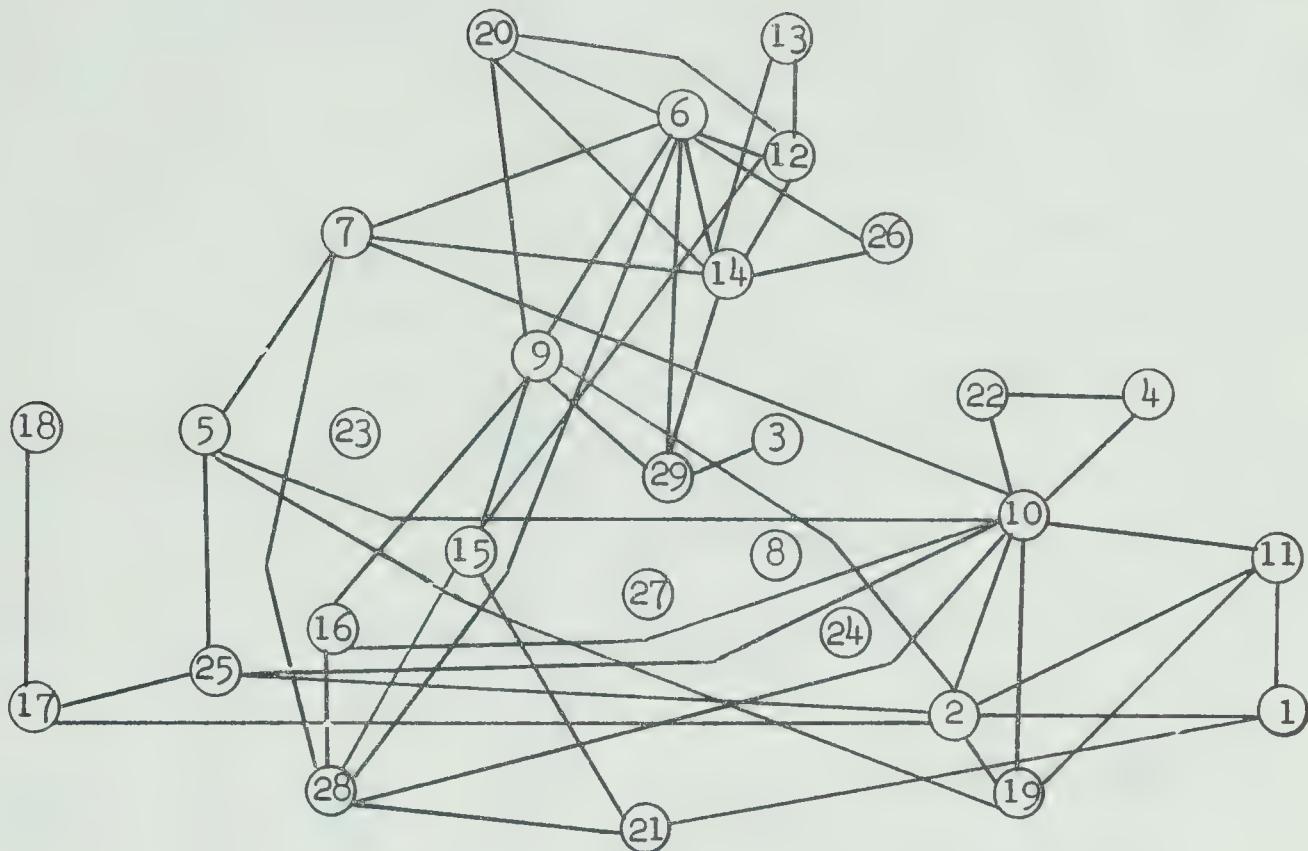


Figure 29

January 1970: Organization Communication

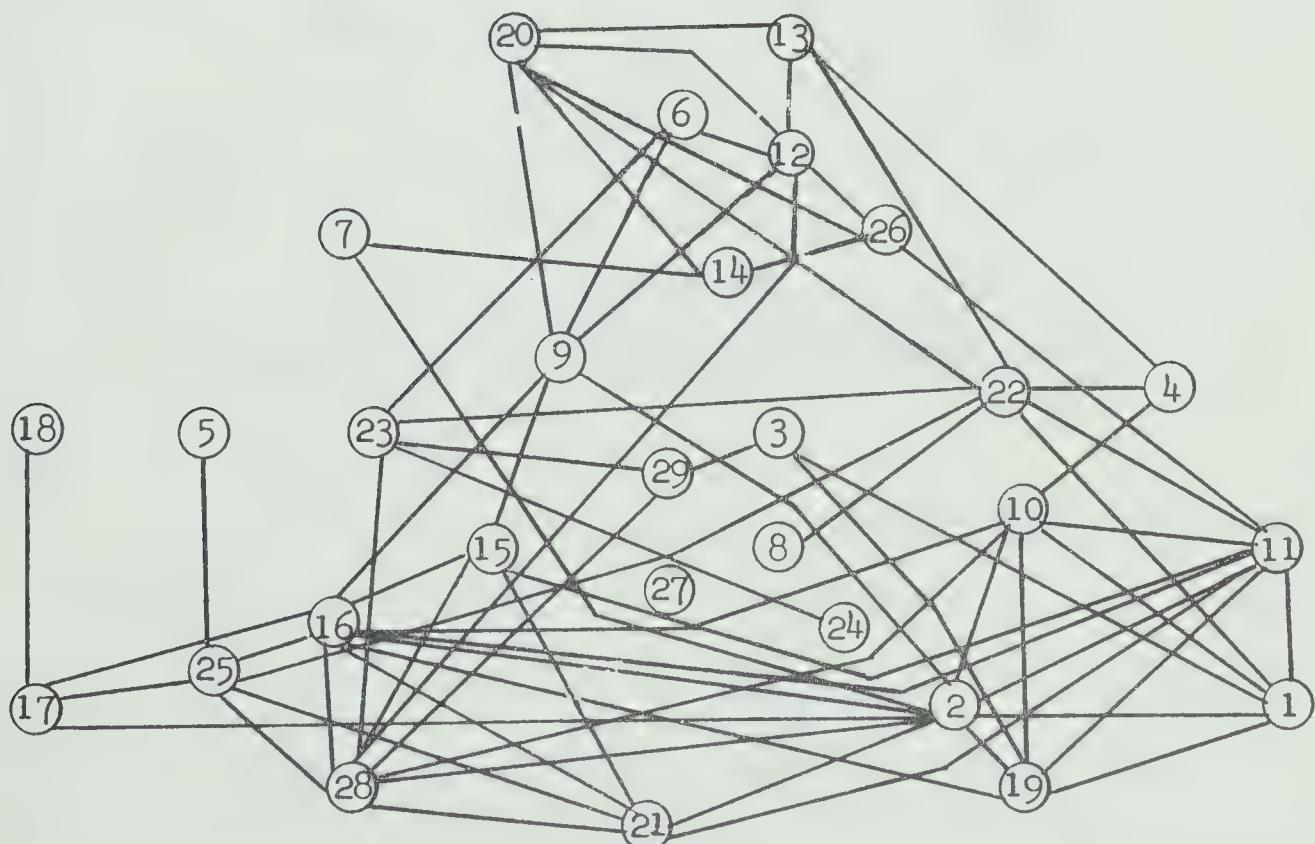


Figure 30

January 1970: In-depth Social Communication

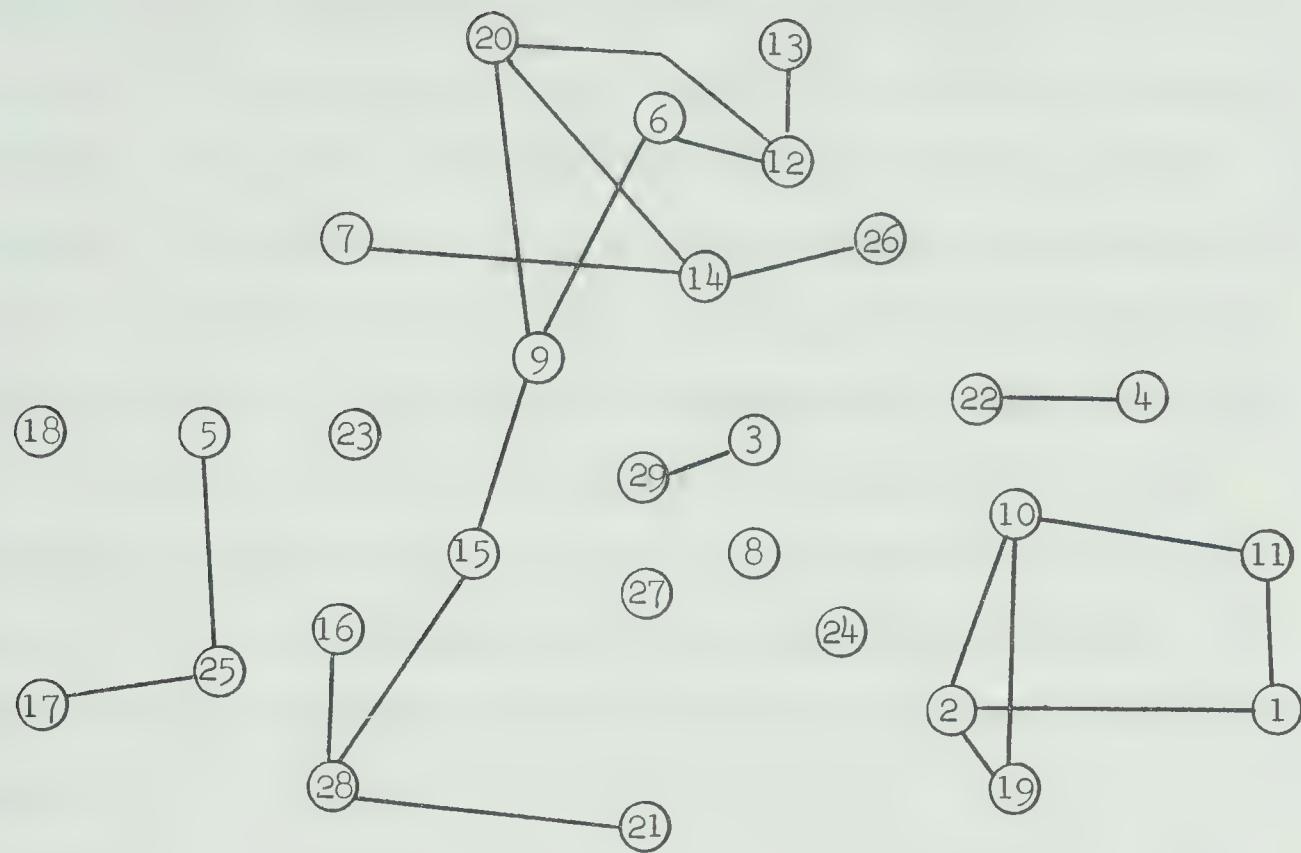


Figure 31

January 1970: All Types of Communication

Organization communication. As in the case of organization communication in the Fall, the secretarial staff reported no reciprocated communication links. All other staff reported at least one link which was reciprocated.

The cubed matrix of the network of organization communication showed that six people (persons 3, 8, 18, 23, 24, 27) did not belong to any clique and that four people (persons 2, 6, 10, 14) were members of more than five cliques. An analysis of the clique structure revealed the existence of two major groups of cliques which centred on persons 6 and 14 and 2 and 10 respectively. Persons 7 and 28 served to link the two groups of cliques which were otherwise quite separate. The cliques which centred on persons 10 and 2 encompassed eleven different people. Those centring on persons 6 and 14 involved seven different people.

In-depth social communication. The concentration of horizontal lines noted in the representation of the Fall in-depth social communication reappears more strongly in Figure 30 which shows the patterns of this kind of communication in January 1970.

The examination of the clique structure revealed by the cubed matrix showed that six people were not members of any clique and that seven people (persons 2, 10, 11, 16, 19, 21, 28) were each members of ten or more cliques.

When the membership of the cliques centring on these seven people was analysed it was found that sixteen people

belonged to them. The total number of respondents at this period was twenty-nine, and therefore there were thirteen members not accounted for by this set of cliques. Of these thirteen, six were shown in the cubed matrix as belonging to no clique at all. An examination of the remaining seven people and the cliques to which they belonged showed that these cliques contained only two people who were members of the large clique set already analysed. In each of the two clique sets there were a further three people who showed individual links with members of the other set, but these individual links were not part of any clique structure.

Table 2 summarizes the findings of the analysis of cliques formed by the in-depth social communication in January 1970. Persons 9 and 22 belonged to both sets of cliques, and individual links between cliques were formed by persons 10 and 4, 11 and 26 and 6 and 23. If these links are ignored the two quite separate sets of clique members are seen to be persons 6, 12, 13, 14 and 20 on the one hand, and persons 1, 2, 3, 15, 16, 17, 19, 21, 25, 28 and 29 on the other. The key members of each group were persons 12 and 20 and 2 and 16 respectively.

All types. When those communication links were isolated which existed in all three types of communication together, two main and three subsidiary nets were found (Figure 31). The two main nets were quite separate and consisted of links between persons 6, 7, 9, 12, 13, 14, 20 and 26, and persons 1, 2, 10, 11 and 19 respectively. One of

TABLE 2

 CLIQUE MEMBERSHIP IN THE NETWORK OF
 IN-DEPTH SOCIAL COMMUNICATION: JANUARY 1970^(a)

Members of larger clique set	Members of smaller clique set	Members of both clique sets	Members with individual links between sets
1	4	9	10, 4
2	6	22	11, 26
3	9		26, 6
9	12		
10	13		
11	14		
15	20		
16	23		
17	26		
19			
21			
22			
23			
25			
28			
29			

(a) Numbers in this table are identification code numbers of staff. See Appendix B.

the subsidiary nets (persons 16, 21, 28, 15) was linked with the larger main net through persons 15 and 9. The other two subsidiary nets were separate and consisted of two-way channels between persons 22 and 4 in the one case, and persons 25 and 17 and 25 and 5 in the other.

Summary. The enormously complex network of work communication between twenty-nine respondents in January 1970 centred on the support staff who formed links between almost all members of the organization. Other key staff were persons 6, 12, 13, 14, 26, 7 and 5. A consideration of the organization communication and the in-depth social communication revealed in each case the existence of two major sets of cliques. The two clique sets in the network of organization communication centred on persons 6 and 14 and 2 and 10 respectively. In in-depth social communication the key people for each set were persons 2 and 16 and persons 12 and 20.

A Summary of Communications over Twelve Months

This chapter has reported the analysis of three kinds of communication among the in-house staff of H.R.R.C. at selected periods over twelve months.

With the increase in staff size went a greatly increased complexity of communication networks. In some areas there was also a marked separation within the networks. The increasing complexity was most apparent in the case of work communication. Behind the intricate web of links it was

possible to see the central linking function of the support staff whose involvement became central almost as soon as they took up their appointments. If the support staff were discounted it was seen that the other central members of the work communication network were the Director, the Deputy Director and the Research Officers. When these people were removed from the analysis the work communication paths were few in number and generally restricted to connections between Research Assistants who worked in the same project area or who shared the same office. No clique formation was apparent when support staff and senior staff were discounted.

Analysis of clique structures was more revealing in the case of organization and in-depth social communication. As the year progressed there emerged in each case two relatively distinct sets of cliques, each of which centred on a few people. Table 3 shows the most central members of each set and the link persons between sets for both types of communication in each of the five selected periods. Although the in-depth social communication cliques show some changes of core membership in clique set II, the two groups of core members remained fairly stable, with persons 6, 12, 14 and 20 being on the whole separated from persons 2, 10, 11, 16 and 19. Person 9 was a constant link between sets except for the clique sets of organization communication in January 1970.

Table 3 does not show the relative size of each of the clique sets. It was noted, however, that clique set II

TABLE 3

ORGANIZATION AND IN-DEPTH SOCIAL COMMUNICATION: KEY MEMBERS
OF EACH OF TWO MAJOR CLIQUE SETS AND LINKS BETWEEN SETS (a)

	Organization Communication			In-depth Social Communication		
	Clique set I	Links	Clique set II	Clique set I	Links	Clique set II
April	6, 12, 20	-	-	-	12, 20	-
June	6, 12, 20	9	1, 2, 11	6, 12, 20	9	1, 2, 11
August	6, 12, 14	7, 9	10	6, 12, 20	9	2, 10
Fall	6, 12, 14, 20	7, 9	2, 10	6, 12, 20	9	2, 10, 16 19
January	6, 14	7, 28	2, 10	12, 20	9, 22	16, 2, 11

(a) Numbers in this table are staff identification numbers. See Appendix B.

tended to involve increasingly more members than clique set I towards the end of the twelve-month period.

CHAPTER 6

COMMUNICATIONS IN A GROWING ORGANIZATION

This chapter deals with sub-problem 3 and seeks to relate the two aspects of the study: organizational growth and communications. The framework established by a consideration of the three growth dimensions of size, shape and age will be used.

SIZE

Staff Size

The increase in staff size over the period of the study was clearly reflected in the increasing complexity of the communications networks within H.R.R.C. This complexity was most apparent in the number of communication links reported, but is also seen in the number of cliques to which staff belonged. Table 4 shows, for each type of communication, the number and percentage increase of personnel and reported communication links at each of the five selected periods. The table also shows the number of cliques to which the most involved staff member belonged. Each of the horizontal divisions of the table represents a different type of communication and will be discussed separately in the following paragraphs.

Work communication. The largest and smallest

TABLE 4

H. R. R. C. COMMUNICATION 1969 - 70: NUMBERS AND PERCENTAGE INCREASE OF RESPONDENTS, COMMUNICATION LINKS AND CLIQUES INCLUDING THE MOST HEAVILY INVOLVED MEMBER

Respondents			Links			Cliques to which most heavily involved member belonged		
	Number	% Increase		Number	% Increase		Number	% Increase
W	April	9	27	36	55.5	I	7	4
O	June	13	44	56	8	N	16	100
R	August	21	61.5	126	125	S	16	75
K	Fall	26	24	123	23.5	A	24	71.5
	January	29	11.5	144	17	D	34	66.5
						O	35	
						E	69	
						C		
						P		
						T		
						L		

increases in the number of work communication links occurred with the largest and smallest increases in the number of respondents. At no time was the increase in the number of reported links less than the increase in the number of respondents.

The increase figures (Table 4) for June and August need little comment since the summer of 1969 was the period of the greatest staff increase in H.R.R.C. and the addition of eight staff doubled the number of work communication links. The figures for Fall 1969 and January 1970 are of more interest. A twenty-four per cent increase in staff between summer and fall resulted in a twenty-four per cent increase in the number of communication links, whereas a staff increase of only eleven and a half per cent between fall and January resulted in a seventeen per cent increase in the number of communication links. This may be interpreted as meaning that the five staff who arrived after the summer made fewer new work communication links per person than did the three who arrived at the turn of the year.

This interpretation may be explained by a consideration of the positions to which the new staff were appointed. Between August and the end of October the new staff were three Research Assistants and two secretaries --all staff whose areas of work responsibility were fairly circumscribed. Moreover, one of the Research Assistants spent much of his time outside the building on library research and, in addition, had a five weeks' absence because

of illness. The three new staff who arrived during the winter, however, included the Editor as well as two Research Assistants. While the Research Assistants reported fairly restricted communication, the nature of the Editor's work was such that she was obliged to consult with staff in all parts of the organization.

The fifth and sixth columns of Table 4 show the changes in the number of cliques to which the most heavily involved person belonged. At all periods after April the person who featured in most cliques was a member of the support staff--in June, August and Fall the Information Officer, and in January the Business Manager. In all periods except August the increase in the number of cliques was less than the increase in the number of reported communication links and in the last period--January 1970--it was only half as great. In this latter case the interpretation again seems to lie in the fact that one of the new staff was the Editor.

Since the Editor reported a direct work communication link with both the Business Manager and the Information Officer, her links elsewhere in the organization were an important factor in increasing the number of cliques to which these two people belonged. An examination of her reported communication links revealed that, in addition to those with the other support staff, she had links with seven Research Officers and two Research Assistants. The Editor's work communication, that is to say, was not

distributed across the whole organization, but tended to be restricted to the more senior staff.

Organization communication. The pattern of the increases in the number of links reported in communication about the organization was broadly similar to the pattern for work communication. The size of the increases, however, was in every case less. The pattern of changes in the number of cliques to which the most heavily involved person belonged was very different from that noted in the discussion of work communication.

In the first four periods the Director (alone or with two other Research Officers) was the most heavily involved person in terms of clique membership. In January he was the second most heavily involved person. The increase in staff between April and June--three Research Assistants and the Business Manager--brought no change in the number of cliques to which the Director belonged. The large influx of staff during the summer increased his involvement in cliques by 120 per cent. In the Fall it increased by only nine per cent, and none of the increase was due to an increase in staff size, since none of the cliques to which he belonged included any of the new members of staff.

By January the Director was no longer the most heavily involved person in organization communication, but the greatest number of cliques to which any one person belonged showed a decrease of 16.5 per cent. These findings

seem to imply some kind of separation in the organization and will be referred to again later in a consideration of the changing shape of the communication patterns in H.R.R.C.

In-depth social communication. The patterns of change in in-depth social communication were different from those of either work or organization communication. The number of links showed a great increase in June and an even greater one in August. In the last two periods of the analysis the increase was smaller, but, nevertheless, greater than the increase in the other two types of communication. It was, moreover, in these last two periods a relatively constant increase of thirty-four per cent in the Fall and thirty-five per cent in January.

The maximum number of cliques to which the most heavily involved person belonged increased sharply in June and less sharply but fairly constantly thereafter. The greatest increase in staff size was not accompanied by the greatest increase in the formation of in-depth social communication cliques. The implication seems to be that groups who communicated socially in depth were dispersed throughout the organization rather than tending to centre on any one person.

Physical Plant

Although many respondents felt that the layout of the building had an important effect on the internal communications, the analysis of reported communications

did not show the effect in any conclusive way.

In seven cases office locations or changes of office locations appeared to have affected communications. The seven cases involved nine staff. Two Research Assistants (persons 1 and 2) shared an office during the whole of the period of the study. A Research Assistant who arrived in the winter (person 21) was accommodated in the same office as the doctoral fellow with whom he was working (person 28). The relevant communication sociograms show constant links between persons 1 and 2 and between persons 21 and 28 at all levels.

Another Research Assistant (person 17) was involved in two office changes. Initially she had an office adjacent to person 13 and later was located adjacent to person 25. A Research Assistant (person 19) who arrived at the beginning of October was initially also given the office adjacent to person 17 which she shared with person 25. By January person 19 had been relocated in an office which she shared with person 11 on the other side of the building near to persons 1 and 2. The communications analysis revealed changes in the links between these people which appear to reflect their changes in location.

The final example concerns person 9 who, late in 1969 was moved into a relatively isolated office in the east basement. In this case, however, the office change may not necessarily have been associated with the decrease in communication links which was observed for person 9 in

January since he spent only part of his time at H.R.R.C. during the last four months of the period of the study.

Apart from these cases there is no clear evidence that the physical plant affected communications. It is true that persons 10, 11, 1, 2, 19, 14 and 22, who are strongly linked in the later sociograms, were located in the east wing of the building, but their links were not exclusive to each other. Moreover, the strongest connections between people who were located in the same wing occurred in the context of work communication between Research Assistants. Links in the context of organization communication and of in-depth social communication were much less geographically restricted, as were links between Research Assistants and Research Officers. It is debatable whether the building, the allocation of offices according to project areas, or the nature of the work itself was the chief factor behind any clustering of communication links between people in the same parts of the building.

SHAPE

Formal Structure

In Chapter 4 it was noted that there were two formal structures in H.R.R.C. during the period of the study. The two structures were similar in three respects: they were blueprints for activity rather than representations of organizational activity at the time of their publication, they referred to the subdivision of a program rather than to

the flow of personnel functions, and they were both essentially pyramidal in shape. The differences between the structures lay in the relative separation of sub-units in the later structure and that structure's greater scope and different organization. The reorganization of the sub-units at the end of 1969 brought the biggest change to the evaluation unit which changed from being a separately coordinated unit to being a part of Organizational Services.

Work communication. The picture of interaction which emerged from an analysis of work communication appeared to have little meaning in relation to the separate parts of either of the formal organizational diagrams. Whilst it was clearly not the case that everyone talked with everyone else, there were, nevertheless, enough links present to result in a sociogram which presented a confusing array of lines. Three points of interest emerged, however, one of which relates to the discussion in Chapter 4 and two of which reveal elements lacking in the formal organizational diagrams.

One of the points raised above in connection with the comparison of the two organizational diagrams was that neither represented the reality of the organization at the time of its publication. The work communication patterns of April 1969 help to confirm this point. The diagram of these communications at Figure 9 shows a great deal of interconnectedness between the members of the small staff, and the clique structure shows that, with the exception of

one Research Assistant, all staff were members of the cliques centring on all other staff. The picture given by these analyses is reminiscent of that given by the respondent who referred to ". . . a happy band of planners." The interaction between staff in April did not resemble the interaction which might be expected from an examination of the organizational chart.

The discussion of the formal organizational charts in Chapter 4 also showed that the charts represented the subdivision of a program of research rather than a flow chart of personnel functions. The analysis of communication patterns seems to complement a study of the organizational charts in this respect, for it indicates two areas of important personnel interaction which are not fully shown by the charts.

The first of these areas is that of the secretarial and support staff (persons 3, 8, 23, 24, 27, 29). In each period for which communications were analysed these staff, and particularly the support staff, were central in the overall work communications network. A comparison of the relevant sociograms both with and without these staff (Figures 17,18,22,23,27,28) shows the much greater relative simplicity of those diagrams which omit them. An even clearer indication is given by the analysis of clique structure. In each of the periods analysed the two persons belonging to the greatest number of work communication cliques were members of the support staff, and the members

of the cliques which centred on them included up to seventy per cent of the total number of respondents.

The second area of interest is that of the senior staff--Research Officers--as opposed to Research Assistants. From the diagrams of work communication networks it is apparent that the senior staff (persons 5, 6, 7, 10, 12, 13, 14, 20) were at the centre of a great deal of communication. More, however, can be learned from the analysis of clique structure. Not only were the senior staff second only to support staff in the number of cliques to which they belonged, but the other members of those cliques tended to be senior staff and not Research Assistants. The indications are then, that in their work communication the senior staff talked more with each other and with the support staff than with the Research Assistants.

Organization communication. The discussion of organizational growth in Chapter 4 showed that there was a continuing appraisal of the organization throughout the period of the study. This feature of H.R.R.C. was reflected in the continuing presence of reported links of communication about the organization.

In order to assess the extent to which these links were spread throughout the different levels of staff they were analysed by position of respondents. Staff were categorized as Research Officer (including the Director, the Deputy Director and the post doctoral Fellow), support and secretarial staff, and Research Assistant (including the

doctoral Fellow). The number of links reported by staff in each category was expressed as a percentage of the total number of links reported in each period. For purposes of comparison the number of respondents in each category was expressed as a percentage of the total number of respondents in each period. The figures are presented in Table 5. The secretarial and support staff clearly showed a decreasing participation in this type of communication. The participation of the Research Assistants appeared to increase sharply in June then to decrease in August, following which it increased as their numbers in the organization increased. In the last three periods of the analysis the increasing numbers of Research Assistants and secretarial and support staff meant that the proportion of Research Officers declined. Their participation in organization communication, however, did not decline as sharply. In June they represented thirty-eight per cent of the total respondents and they reported forty-seven per cent of the communication links. By the Fall, although the Research Officers accounted for only thirty-five per cent of the respondents, they reported fifty per cent of the number of links. The figures for January (thirty-one per cent of respondents and forty-five per cent of links) indicate that their participation was still proportionately higher than it had been in June. The increase may be assumed largely to have been at the expense of communication involvement by the secretarial and support staff at this period, since the Research Assistants had

TABLE 5

ORGANIZATION COMMUNICATION: PERCENTAGE OF TOTAL
 LINKS REPORTED BY THREE CATEGORIES OF
 STAFF AT EACH PERIOD

	Research Officers (a)		Support and Secretarial Staff		Research Assistants (b)	
	% Links	% Staff	% Links	% Staff	% Links	% Staff
April	79	(56)	13	(22)	8	(22)
June	47	(38)	11	(23)	42	(39)
August	58	(43)	8	(14)	34	(43)
Fall	50	(35)	7	(19)	43	(46)
January	45	(31)	6	(20)	49	(48)

(a) Includes Director, Deputy Director and post doctoral Fellow.

(b) Includes doctoral Fellow.

increased the proportion of their links more than they had increased their proportion of the total responding staff.

Organization communication and clique structure. If the preceding analysis shows that organization communication extended across both Research Officers and Research Assistants and also, to a much smaller extent, the secretarial and support staff, it nevertheless does not indicate the interaction between various staff members. To explore this question it is necessary to examine the clique structure formed by the links of organization communication.

Although the structure can be seen by a close inspection of the relevant sociograms, it is probably seen more easily by listing the members of various cliques. Appendix C presents tables to show the membership of certain cliques in all three kinds of communication at all five periods. All tables in that Appendix are of the same design. Column 2 identifies those staff members who were most heavily involved (i.e., who belonged to the greatest number of cliques). These staff are listed in rank order--most to least heavily involved. Staff bracketed together belonged to an equal number of cliques. Column 3 shows the members of all cliques to which these heavily involved staff belonged, and column 4 lists those staff who reported no direct reciprocated contact with any of the clique members listed in columns 2 and 3.

Throughout the five periods the Director was among the staff most heavily involved in organization communication.

In August and Fall the list included one Research Assistant (person 9) and, in the Fall only, the Information Officer. All other persons listed as heavily involved were Research Officers. By January 1970 person 10 was the single most heavily involved person. The presence of person 9 in the lists for August and Fall is of interest since he was the instigator of the informal summer seminars at which the aims, policies and functions of the organization were discussed.

The membership of the cliques to which the most heavily involved persons belonged showed a great similarity in all periods. The exceptions were those cliques (Fall and January) which centred on person 10. The membership of these cliques was different and included only two staff (persons 7 and 9) who belonged to any cliques centring on other Research Officers.

When this finding is considered in the context of the development of the formal structure of H.R.R.C. it is possible to see a relationship between the clique membership and the structure. Person 10 was the coordinator of Evaluation Services. In the formal structure of April 1969, the evaluation unit may be held to have occupied an uncomfortable position.¹² In the later structure, Evaluation Services seems to have lost autonomy more than any other

¹² Perhaps the best description of this position is afforded by a figurative question. Evaluation services is located between the two "wheels" of the first formal diagram (Figure 5, p. 53). One may ask of such a diagram, "What happens when the wheels begin to turn?"

single unit (Figure 7, p. 58). Clearly, in terms of the formal organization, the evaluation section was something of a problem area and the development of a set of overlapping cliques whose members were, on the whole, not represented in the older set of cliques may reflect the behavioural results of a structural weakness.

If this was the case, its effects on the whole staff may be glimpsed from an examination of the staff who had no direct contact with members of the various cliques. Those with no direct contact with members of any organization communication cliques are either secretarial staff (persons 23, 24, or 27) or Research Assistants whose work was relatively isolated and who spent a considerable time out of the building (persons 4 and 22). Apart from these staff, those without direct contact with the older clique set were, on the whole, those who featured in the newer clique set, particularly in January 1970. Whilst the membership of the older clique set was largely composed of Research Officers, that of the newer consisted, with two exceptions, of Research Assistants. One of the exceptions (person 7) was a link between the two clique sets.

Task Structure

The discussion of the task structure in Chapter 4 showed that nine staff had experienced some kind of change in their work during the period of the study. The organizational responsibilities of five members had changed. Those of two had expanded and those of two more had changed

within their project area.

An examination of the reported work communication reflects these changes only in part. Of the five staff whose responsibilities changed in relation to the total organization, three were senior staff (persons 12, 13, 20), one was a Research Assistant (person 17) and one was a member of the secretarial staff (person 23). The changes in the responsibilities of the senior staff and the secretary were not clearly marked by any noticeable change in the patterns of their work communication other than an increase in the number of people they talked to. In the case of the Research Assistant work communication became more restricted in that after April it took place only with support staff and those Research Officers and Research Assistants directly involved in the area of her project.

All these five staff were members of the initial core staff who, before the arrival of other staff members, were involved with each other and with all areas of the proposed H.R.R.C. program. It is, therefore, not surprising that their work communication should show an increase in the number of people with whom they communicated rather than a change in which people they talked to about work-related matters.

In the case of one of the two staff whose duties expanded (person 9) the work communication network did not show any change beyond a slight extension as the staff size increased. In the case of the other staff member in this category (person 26) there was a great increase in the number

of reciprocated links reported--from nine links in the Fall to eighteen in January. It is probable that this increase reflected that staff member's designation as Associate Coordinator of Education Studies towards the end of 1969. The two Research Assistants (persons 16 and 25) whose work changed within their own project area showed little change in their work communications during the two periods at which they were on staff.

Social Structure

It was noted in Chapter 4 that not until early 1970 did there appear to be a pattern of distinctively social relationships among the in-house staff of H.R.R.C. These relationships had crystallised into a structure in which two main centres could be discerned.

The patterns of communication only approximately matched this social structure but the closest approximation was given by the patterns of in-depth social communication. Figures 32 and 33 show the sociograms representing the in-depth social communication at January 1970 and the staff nominations of social relationships outside the context of work. Figure 32 is a reproduction of Figure 30. Figure 33 contains the same information as Figure 8, but for purposes of comparison it has been redrawn so that the staff are arranged in the same way as in the communications sociograms. Clearly the diagrams are similar only in the very general sense that the top and bottom of each shows concentrations of lines rather greater than the area between these two

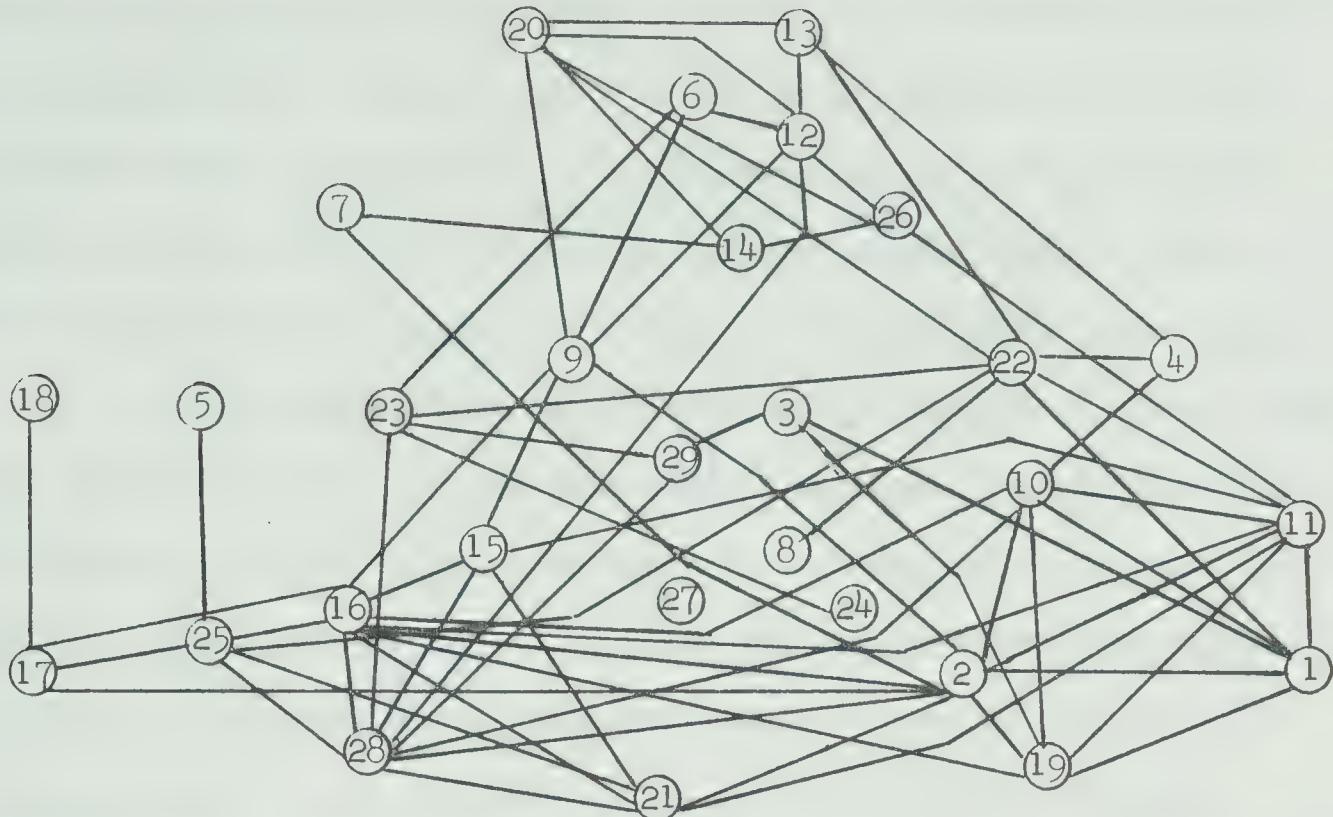


Figure 32

January 1970: In-depth Social Communication

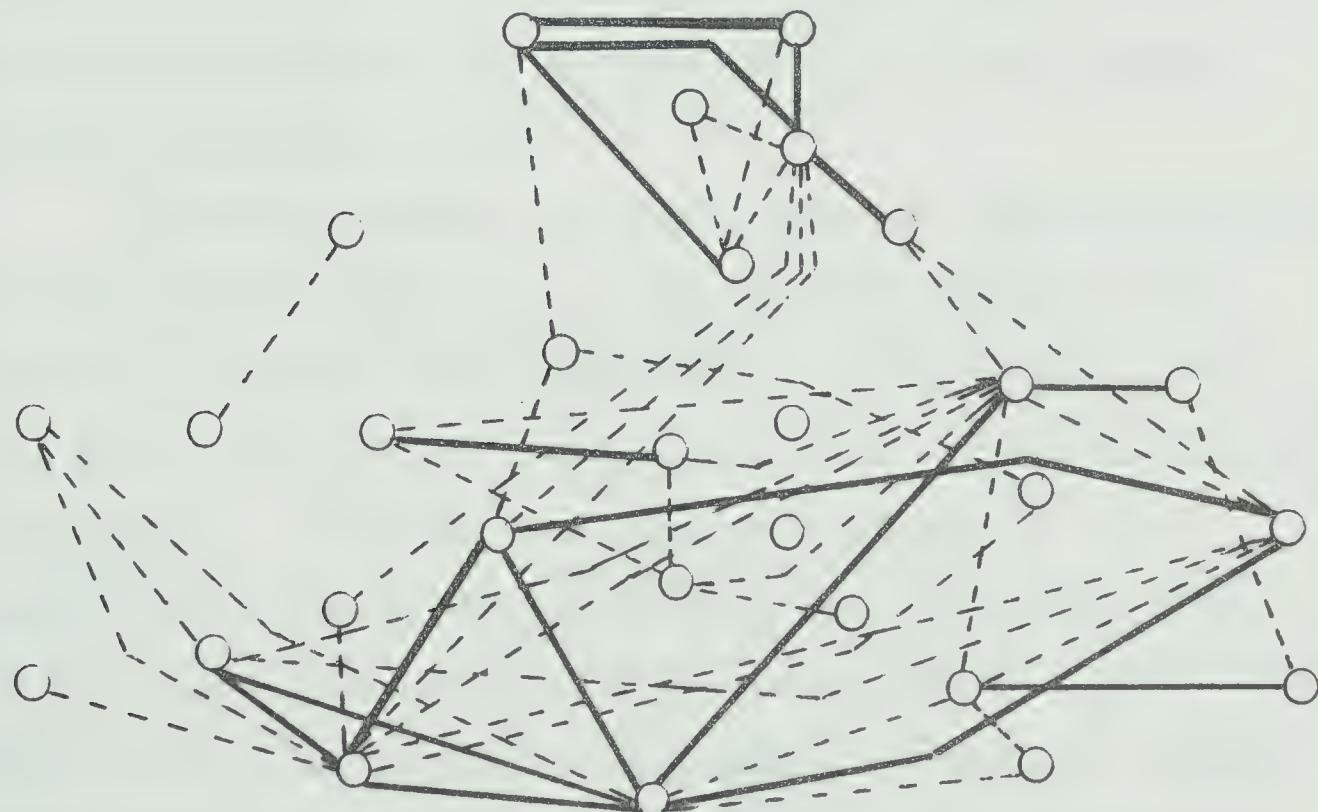


Figure 33

January 1970: In-house Staff Nominations of Social Relationships Outside the Context of Work

parts. The indication seems to be that, although the two main centres of communication were, with slight difference of membership, present in the pattern of social relationships, the network of in-depth social communication was more extensive than the structure of friendship relations.

Two reasons for this might be suggested. The first lies in the nature of the kind of conversation defined here as in-depth social communication. It may be that, as has already been suggested, in-depth social communication is difficult completely to separate from other kinds of conversation in an organization such as H.R.R.C. where an intelligent and academically oriented staff is concerned with the problems underlying social research. The fact that such communication takes place between two members of staff may not necessarily be an indication of a closer social relationship between them.

A second reason for the no better than approximate matching of Figures 32 and 33 may be the importance in Figure 32 of some staff whose social relationships with most other staff did not extend outside the context of the organization. Such was the case with person 16, who reported that his circle of friends were not members of H.R.R.C., and probably also with person 9 who reported only three out-of-work social relationships with staff members. Both these staff played a central role in the network of in-depth social communication. The centrality is particularly noticeable in the case of person 9 who from June 1969

formed a link between what were to become two distinct clique sets.

AGE: A CHRONOLOGICAL RÉSUMÉ

The chronology of the growth of H.R.R.C. considered with the changes in the internal communication patterns over time forms a convenient summary of the relationships between the two dimensions. Following the arrangement of Chapter 4, this section will present the summary in the form of a month by month synopsis.

January to April 1969

During this period the small staff of H.R.R.C. worked closely with each other on the detailed planning of the project areas outlined in the formal structure which was accepted by Council in January and of which a diagram was published in April.

Work communications flowed freely between members of the group, but by April it was possible to discern patterns of organization and in-depth social communication which were concentrated in a small core group consisting of the Director and Deputy Director with one Research Officer. One other Research Officer and the Information Officer were very closely linked to this core group.

April to June 1969

The arrival of seven new in-house staff enabled initial work in the seven program areas to be extended.

The communication networks were considerably extended and although a few senior staff continued to form a core in all types of communication, a small number of separate cliques began to form. One of the new staff served to a large extent to link persons whose communications otherwise did not overlap.

The work communication links of the Research Assistants at this period were less with each other than with the senior staff and the support staff. The Assistants were, however, each working in separate project areas so that this kind of communication pattern might be expected. Their relationships with each other were more exclusive in organization and in-depth social communication. Except for the linking function of person 9 (a Research Assistant) these kinds of communication followed networks which were almost entirely differentiated by status.

July and August 1969

During this period of rapid staff expansion several areas of the formally structured program became staffed for the first time. In an informal seminar atmosphere the staff were able to discuss the organization's mandate, direction and structure. Some staff were concerned about the inadequacy of the organizational structure in facilitating their work, and towards the end of the period the Director instigated a program of reassessment within the organization.

The size of the communication networks in August had greatly increased with the increase in staff size and the

analysis of work communication showed the centrality of the support staff in the network. These staff played a much smaller part in the networks of organization and in-depth social communication. In these areas the fairly extensive patterns of communication had two points of interest. First, the Research Assistant who instigated the informal seminars to discuss the organization had more reciprocated links of organization communication than any other person. Second, the clique structure showed the emergence of two different clique sets linked mainly through two staff. The larger of these clique sets centred around the Director, the Deputy Director and two Research Officers. The smaller centred on the Coordinator of the evaluation unit and one Research Assistant.

September to November 1969

The staff size increased by five during this period. A retreat of the more senior staff at Red Deer resulted in agreement upon a revised organizational structure. This proposed revised structure replaced the seven program areas by five program units and two support units. Although agreed upon, it could not become operational until ratified by Council.

The communication patterns in the Fall were similar to those in August except that there were several indications of increased fragmentation within the networks. In work communication two Research Officers were rather less closely linked than before with the senior staff who formed the core of the clique structure. In organization and in-depth

social communication the two distinct clique sets continued to exist. The larger clique set in the network of organization communication centred on the Director, the Deputy Director and three other staff, whereas in in-depth social communication these members belonged to the smaller clique set and the larger one centred on the Coordinator of Evaluation Services and three Research Assistants.

December 1969 to January 1970

Three Research Assistants, the Editor and one secretary took up their appointments during this period. The new structure of H.R.R.C. was accepted by Council in December and, for those areas of the program already in existence, became operational immediately.

The analysis of communications in January 1970 revealed that the support staff continued to be central in the work communication network and that apart from them the senior staff were key persons in clique formation at all levels. The existence of two distinct clique sets in the networks of organization and in-depth social communication continued, but their respective sizes had changed. In both types of communication the initial core staff were now the centres of the smaller clique set.

SUMMARY

This analysis has shown that the communications networks of H.R.R.C. became increasingly extended as the organization grew between mid-January 1969 and mid-January

1970. As the networks grew the patterns of communication changed.

Partly the changes were a function of increased size. As more staff arrived more links emerged in all three kinds of communication--work, organization and in-depth social. In a few cases communication patterns changed with changes in office location. In general, however, the influence of the building design on the internal communications was not established by this analysis.

The communications also changed in the context of a changing organizational structure. The staff were involved in discussions of the aims, structure and direction of H.R.R.C. and such discussions were not restricted to any single group of staff. Increasingly, however, they did not flow freely between all staff and, from the late summer, the emergence of two fairly separate groups was shown by an analysis of the communication clique structures in both organization communication and in-depth social communication. To some extent the two separate groups were mirrored by the social relationships reported by the staff of H.R.R.C.

The emergence of a communication structure which, in large part, had two separate centres, did not match the emergence of the new formal structure with its semi-autonomous program units and its two support units. The beginnings of the two clique structures antedated the formalization of the new structure and, moreover, the members of the cliques were distributed among all the operational units of

the organization. Communication patterns were, rather, distinguished on the basis of the positions of staff in the organization and seemed also to be related to an apparent problem area in the formal structure of the organization.

Thus people appointed to the support staff acquired very soon after their arrival a central position in the network of work communications. Senior staff tended to talk more about all topics with each other than with Research Assistants, but among the senior staff the Director and some members of the initial core staff of the organization continued to form the nucleus of a set of overlapping cliques of communication, particularly of communication about the organization. The Research Assistant whose role was initially to examine the mandate of the organization and subsequently to assist in reformulating the organizational structure emerged in the network of communications as an important linking figure between two sets of people whose communications did not greatly overlap.

The second set of cliques in the network of organization communication (and, to a lesser extent, in-depth social communication) became focussed on the Coordinator of Evaluation Services, and its emergence may, perhaps, be associated with the position of the evaluation unit in the original formal structure of the organization and with its relative loss of autonomy in the later structure. Conclusive evidence for such an assertion does not exist. It does, however, seem a plausible inference

from the data analysed.

Most of the members of the second clique set were Research Assistants. Before the late summer the numbers of Research Assistants had been proportionately small and communication between them had not formed a significant clique structure in the same way as that between the senior staff. It is possible that organizational concerns among this group gave a focus to communication which might otherwise have patterned itself on the structure of social relationships.

Whatever the value of these speculations, it remains true that the increase in communication was not a simple matter any more than the problems which confronted the organization during this period were simple. What determined the way in which communication patterns grew and changed was less the increase in staff size and the lay-out of the building than the positions held by staff and the work they performed. In this sense rather than in any quantitative sense the communication patterns reflected the growth of the organization.

CHAPTER 7

SUMMARY, METHODOLOGICAL AND THEORETICAL IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

SUMMARY

This study examined the growth and the internal communications of the Alberta Human Resources Research Council during the period mid-January 1969 to mid-January 1970. The growth of the organization was examined in the framework of the three dimensions of size, shape and age. Communications were examined in the framework of an empirically determined tripartite categorization of communication. The patterns of three kinds of communication at five points in time were examined.

Data were collected from documentary sources, by observation and by interviews with the in-house staff of H.R.R.C. Data about growth were treated topically and chronologically. Data about communications were cast in matrix form and subjected to matrix multiplication so that an analysis of clique structure could be carried out.

The study showed that there was a great increase in the staff size of H.R.R.C. during the twelve-month period. In a climate of reassessment set by the Director, the staff were able to agree on a comprehensive revision of the formal

structure which was in existence at the beginning of the period. By the end of the period the new structure was operational. At this time, too, a social structure among the members appeared to have emerged in which there were two distinct centres.

The analysis of communications revealed an increasing complexity of networks as the staff size increased. Within the complexity certain dominant features could be discerned.

In work communication the support staff were central and had direct links with most members of staff. The senior staff also served as important links in work communication between the different project areas. They communicated more with each other, however, than they did with Research Assistants.

The analysis of communication about the organization itself and of communication about in-depth social topics showed the emergence, from the late summer of 1969, of two separate sets of overlapping cliques linked by one or two staff.

These sets of cliques could be differentiated to some extent by the status of their members in the organization. More important, it was noted that the core members of one clique set were senior staff who had formed part of the initial staff of the organization and had always had close connections in all communications networks. Core members of the other clique set had an interest in one particular part of the organization which had had an ambivalent position in

the early structure, and which appeared to have lost some autonomy in the reorganization of the structure at the end of the year.

The study showed that the internal communications of H.R.R.C. reflected its growth by reflecting the shifting patterns of interaction among the staff and by revealing the effects of staff positions and work upon these interactions. In this sense the study of communications was the study of an important dimension of an organization which complemented the study of its formal structure and growth.

METHODOLOGICAL AND THEORETICAL IMPLICATIONS

This study was a case study of one research organization and generalizations from it are not possible. The study can, however, be discussed in the light of some of the theoretical statements on which it was based. The analysis of communications data in the study also carries implications for the methodology of sub-group identification. Each of these two kinds of implications will be discussed below.

Methodological Implications

Miklos and Breitkreutz, discussing techniques for the identification of sub-groups within larger groups, write:

. . . The detection of cliques or subgroups has persisted as one of the most intriguing problems in sociometric analysis. Although the inspection of sociograms, the manipulation of rows and columns of the first power matrix, the manipulation of higher power matrices have all proven useful to a point, it is only since the

attempts . . . to factor analyze sociometric data that subgroup detection has been possible for larger groups or organizations (1968:242).

Given the decision in the present study not to use factor analysis, it is worth considering to what extent other methods proved useful and to what extent the analysis of clique structure used here is a fruitful way of examining sociometric data.

Sociograms, provided they are standardized, seem to be a valuable way of presenting comparative data for one organization at different times. Their basic weakness, however, remains: namely, that different researchers using the same data may draw very different sociograms.

The attempt at matrix manipulation in this study proved of very little value.¹³ Matrix multiplication, on the other hand, was invaluable in permitting a ready analysis of clique structure. The difficulty in the use of the cubed matrix appears hitherto to have been the restricting definition of a clique as a group of three people each of whom has a direct link with the other two. The present study showed that this definition is restricting only if each clique is considered in isolation. Once the attempt is made to identify the membership of different cliques, they can be considered together rather than separately and the extent of overlapping membership can be assessed. The concepts of a clique structure and of clique sets (which do not appear to have been used elsewhere) proved useful in identifying

¹³Supra. p. 38.

groupings of people who tended to communicate more with each other than with anyone else. Further, these concepts have the advantage that they do not require a restricting definition of the size of a sub-group.

The analysis of clique membership would be impractical in a larger group without the use of the computer. The present study used the computer to print out details of clique membership. Analysis of overlapping membership was done manually by inspection of the membership lists. This procedure could be made more efficient by the inclusion of an appropriate extra subroutine in the computer program.

Theoretical Implications

The findings of this study can be examined in the light of three different theoretical perspectives: that of growth, that of communication and that of communication as an aspect of growth.

Growth. Perhaps the fullest discussion of organizational growth is that by Starbuck (1965). The findings of the present study support his contention that growth is not spontaneous but is the result of decisions which, in turn, are functions of the goals pursued by members of the organization. This was clearly the case in the processes by which the formal structure of H.R.R.C. was changed over twelve months.

A consideration of Starbuck's "adaptive process" (1965:480-482) leads to the conclusion that more remains

to be said about the growth of H.R.R.C. after the period of the present study. For Starbuck, the adaptive process includes formalization, the formation of an organizational social structure, the hardening and dissolution of coalitions, the shifting of operational goals, the inventing and discarding of procedures and rules and the opening and closing of communication channels. Several of these elements were noted in H.R.R.C. during 1969. The structure was formalized, discarded and reformalized. The reformatory incorporated to some extent a shifting of operational goals to include new project areas. New communication channels opened; some former ones closed. If the existence of two separate clique sets can be translated as the existence of coalitions, then coalitions were forming, as was a social structure. Further study of the period following January 1970 is needed to confirm the continuation of these trends and the existence of other elements of the adaptive process.

Communication. The findings of this study indicate that a perspective of communication which sees it as a reflection of an organization's operation or as symptomatic of various features of the organization (Cook, 1951; Jackson, 1959; Smith, 1966), is a legitimate, if infrequently used perspective of communication. The indications here, however, go further. Communication patterns were not merely a reflection of the organizational growth processes of H.R.R.C., they constituted a complementary dimension which not only filled out the picture of the

growth of H.R.R.C., but also showed in part the relationships between the formal and informal structure of the organization.

Communication and organizational growth. Little established theory appears to exist which relates communication with growth. In general, however, the postulations made in Chapter 1 (based on theoretical statements about each of the two dimensions) were supported by the study.

The number of communication links greatly increased with the increase in staff size and the first significant sub-group structure did not emerge until after June 1969. This latter finding supports earlier writers who found that sub-groups tended to form when a group had more than twelve members (Jennings, 1950; Hare, 1952; Newcombe, Turner and Converse, 1965).

Although communication within project areas was demonstrated, it was less dominant than communication between senior staff or between all staff and the support staff. That this pattern continued increasingly throughout the period of the study in the area of work communication lends support to Litterer's (1965) assertion that the growth of an organization brings a development of the coordination function and the emergence of specialized managers.

Finally, the study showed evidence of the development of differentiated communication flows (Guetzkow, 1965:568) based upon the different kinds of communication. The support staff who dominated work communication played

a very minor part in organization communication, and the Director, who for most of the period was the most heavily involved person in organization communication, was less central in the other networks as the year progressed.

SUGGESTIONS FOR FURTHER RESEARCH

Since one of the primary reasons for this study was that it should form part of a life history of H.R.R.C., further research beyond the termination date of the study is indicated. Considering, as in this study, only the interna of the organization, several suggestions spring from the theoretical implications discussed above.

The question of how the organization continued to grow could well be examined by focussing on the elements of Starbuck's adaptive process. A study of the continuing group structures within H.R.R.C. could indicate whether or not further growth was marked by the hardening or dissolution of coalitions. Similarly, any further development of the emergent social structure could be used as a focus.

One feature of the organization during the period of the present study was that there was no staff turnover. This situation did not continue throughout the following year and a study of the communication patterns in 1970 or subsequent years would be of interest. Such a study would perhaps be able to indicate the extent to which the problems and processes of growth were cyclical and would shed some light on the degree to which the adaptive processes of

organizational growth are dependent on the personnel in the organization.

Finally, the method of analysis of sociometric data used in this study seems a viable alternative to the currently popular factor analysis. It may be useful to use it in the study of communication networks in larger organizations.

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APPENDICES

APPENDIX A

INTERVIEW SCHEDULE

(Name of Respondent) This interview is in two parts. In the first part I would like to ask you about your communications with the rest of the staff at H.R.R.C. In the second part I would like to ask some questions about your background and how you see certain aspects of the organization.

Part I

I am going to go through a list of the in-house staff of H.R.R.C. and for each person on the list I would like you to give me the following information:

Who he or she is.
Whether you talk to him/her.
If so, how frequently?
About what kind of things?

(At this point explain the categories of communication:--Greetings exchanged; Light, casual social; In-depth social; Project/Role specific; Concerning the organization--structure, policies, problems.)

What changes there have been in your communication with this person, either in frequency or content.

That is rather a lot to remember, so I will prompt you as we go on.

Who is _____? (Name of the first staff member)

(Rest of Staff list follows)

(At end of staff list) Which people do you talk to most in the organization?

What would your answer have been if I had asked you the same question in (January) Fall, August, June, April?

Part II

Would you give me a thumbnail sketch of your career since you took your first degree? (In the case of

nongraduate staff, since you became qualified)

Why did you join this organization?

How did you get appointed?

What were you appointed as?

On the first day, how were you introduced into the organization? Where was your office?

Was your job defined for you?

Who did that job before you came?

How do you typically spend a working day here?

What do you presently spend most time on in the organization?

What are the problems that most concern you in your job?

If you want help on these problems, to whom do you go?

(If response indicates people outside the organization, ask specifically for names of people to whom subject goes for help within the organization)

Do you meet any member of H.R.R.C. socially outside the organization? Who? How much?

Is your position included in an organizational chart?

If you wanted to speak to someone in the organization, how would you approach them?

Are you satisfied with your office location? Does it hinder your communication in any way?

Which people do you think are most influential in H.R.R.C.?

If you were asked to say something about the communications within H.R.R.C., what would you say?

APPENDIX B

STAFF IDENTIFICATION NUMBERS USED

IN CODING COMMUNICATIONS DATA

Identification Number	Designation in January 1969 or on appointment if subsequent to January 1969
1	Research Assistant
2	Research Assistant
3	Editor
4	Research Assistant
5	Research Officer
6	Director
7	Chairman of Planning & Policy Studies
8	Business Manager
9	Research Assistant
10	Coordinator of Evaluation Studies
11	Research Assistant
12	Deputy Director
13	Research Officer
14	Chairman of Research & Development Studies
15	Research Assistant
16	Research Assistant
17	Research Assistant
18	Research Assistant
19	Research Assistant
20	Research Officer
21	Research Assistant
22	Research Assistant
23	Director's Secretary
24	Secretary
25	Research Assistant
26	Post-doctoral Fellow
27	Secretary
28	Doctoral Fellow
29	Information Officer

APPENDIX C

CLIQUE MEMBERSHIP

The following tables each deal with one kind of communication at each of the five selected periods (April, June, August, Fall and January).

They present an analysis of the membership of those cliques to which the most heavily involved staff belonged. The format of the tables is as follows: Column 1 shows the month for which cliques were analysed; column 2 lists the most heavily involved staff (i.e., those who belonged to most cliques) in rank order with the most heavily involved person first; column 3 lists all staff who featured in all the cliques to which a given staff member belonged; column 4 lists those staff who had no direct contact with any of the staff shown on the appropriate line in columns 2 and 3.

CLIQUE MEMBERSHIP: WORK COMMUNICATION (a)

	Most Involved Persons	In cliques with	No direct contact with these members
April	5 12 13 19	6 12 13 17 20 23 29 6 12 13 17 20 23 29 6 12 13 17 20 23 29 6 12 13 17 20 23 29	- - - -
June	29 12 13	5 6 8 9 12 13 17 20 23 5 6 8 9 13 17 20 23 29 2 5 6 8 9 12 17 20 23 29	- - -
August	29 8 12	5 6 7 8 9 10 12 13 14 15 17 20 1 2 4 5 6 7 9 10 12 13 14 15 17 20 5 6 7 8 9 13 14 15 20 23 28 29	- - -
Fall	29 8 13	5 6 7 8 9 10 12 13 14 15 16 17 20 22 23 24 25 26 27 28 1 2 4 5 6 7 10 12 13 14 15 17 20 22 23 24 27 28 29 2 4 5 6 7 8 9 12 14 15 23 26 27 28 29	- - -
January	8 29 26	2 3 4 5 6 7 12 13 14 15 17 20 22 23 24 26 27 28 29 3 5 6 7 8 9 10 11 12 13 14 15 16 21 22 23 24 25 26 27 28 1 2 3 5 6 7 8 10 13 14 17 19 21 22 23 24 28 29	- - -

(a) Numbers in this table are staff identification numbers. See Appendix B.

CLIQUE MEMBERSHIP: ORGANIZATION COMMUNICATION (a)

	Most Involved Persons	In cliques with Persons	No direct contact with these members
April	6 12 20	12 13 20 29 6 13 20 29 6 12 13 29	1 23 1 23 1 23
June	6 12	8 9 12 13 20 29 6 13 20 29	1 11 17 23 1 2 5 11 17 23
August	6 14 12 9	7 9 12 13 14 20 29 6 7 12 13 20 29 6 13 14 20 29 2 5 6 7 10 20 29	1 4 11 17 22 23 28 1 2 4 17 22 23 28 1 2 4 5 10 11 17 22 23 28 4 22 23 26 28
Fall	6 14 12 20 29 9 10	7 9 12 13 14 20 29 6 7 12 13 20 29 6 13 14 20 29 6 9 12 14 20 29 6 9 12 14 20 29 2 5 6 7 10 20 29 2 5 7 9 11 19	1 4 8 11 17 19 22 23 24 25 27 28 1 2 4 8 11 16 17 19 22 23 24 25 27 28 1 2 4 5 8 10 11 16 17 19 22 23 24 25 27 28 1 4 8 11 17 19 22 23 24 25 27 28 1 4 8 11 17 19 22 23 24 25 27 28 4 22 23 24 26 27 28 4 12 13 22 23 24 26 27 28
January	10 6 14	2 4 5 7 11 16 19 22 25 28 7 9 12 14 20 26 28 29 6 7 12 13 20 26 29	3 8 12 13 18 20 23 24 26 27 29 1 4 8 11 17 18 19 22 23 24 25 27 1 2 4 8 11 16 17 18 19 21 22 23 24 25 27

(a) Numbers in this table are staff identification numbers. See Appendix B.

CLIQUE MEMBERSHIP: IN-DEPTH SOCIAL COMMUNICATION (a)

	Most Involved Persons	In cliques with	No direct contact with these members
April	12 20 { 20}	6 13 20 6 12 13	1 5 23 29 1 5 23 29
June	12 20 9 { 9}	6 9 13 20 6 9 12 13 2 6 12 17 20	1 8 11 23 29 1 8 11 23 29 8 23 29
August	9 20 12	2 6 10 12 17 20 22	14 23 29 1 11 23 29 1 8 11 23 29
Fall	2 16 { 16}	1 7 9 10 11 16 17 19 2 7 9 10 15 17 19 2 10 11 16 17 25	4 8 13 22 23 24 26 27 29 4 8 13 22 23 24 26 27 29 4 6 8 12 13 14 20 22 23 24 26 27 29
	10 9 { 9}	2 9 11 16 19 2 6 10 12 15 16 20	4 8 13 14 22 23 24 26 27 29 4 8 14 23 24 27 29
January	16 2 11	2 9 10 11 15 17 19 21 25 28 1 9 10 11 16 17 19 21 28 1 2 10 15 16 19 21 22	8 13 14 24 27 5 8 13 14 24 27 5 6 12 14 18 24 27 29

(a) Numbers in this table are staff identification numbers. See Appendix B.

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